

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[The MINING JOURNAL is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.]

1968—VOL. XLIII.]

LONDON, SATURDAY, MAY 10, 1873.

{ PRICE FIVEPENCE.
PER ANNUM, BY POST, £1 4s.

Original Correspondence.

NICKEL AND COBALT, AND THEIR USES.

Highly satisfactory progress made by our miners during the latter part of a century in giving a marketable value to ores previously regarded as almost valueless must be especially gratifying to those who are directly interested in the development of the mineral resources of the country; yet it must be acknowledged that there are many valuable ingredients in the ores actually brought to the surface from which no benefit whatever is derived, either by the miner or by the mine adventurers. It is not many years ago that the tin ores of Cornwall and Devon were scarcely marketable because they were contaminated with wolfram, yet at the present time the separation of the two metals can be readily effected, and instead of the ore realising less because of the presence of wolfram than would have been obtained for other ore containing an equal percentage of tin, the full value both of the tin and of the wolfram, and in proportion to the percentage of each, can be obtained. Wolfram has thus become a metal of value to the miners, and the ores of wolfram would certainly not pay the searching for it so it may be hoped that nickel and cobalt will add to the list of the British mine adventurer, although hitherto almost all the nickel and cobalt used in this country—and the quantity is considerable—has been derived from the richer nickeliferous ores of Norway, North Germany, and elsewhere. Nickeliferous ores have at times been found in marketable quantities at mines in the western counties, and Wheal Chance and Penryn both well known to have produced the sulphide, arseniate, and other salts of nickel; while cobalt ores have been found at Herland, Wheal Sparrow, Dolcoath, East Pool, and other places, but have never formed very important items in the balance, rather, it may be presumed, from their not having received the attention they deserved than from their not existing in marketable quantities. An assay has recently been made of some of the Ashburton district, which shows the presence of nearly 50 per cent of cobalt and 34 per cent of nickel, and as it is stated that the treatment of this ore the nickel and cobalt will be left in solution, no doubt is entertained that they will be made an important source of profit to the proprietors of the mines. Nickel and cobalt ores are usually associated with each other, and nickel and cobalt are now very valuable in the arts, and used in considerable quantities; yet comparatively but little is known of the precise details of the processes carried on in the refineries, each refiner preferring to confine his attention to a particular class of ore (frequently an ore which, from its peculiarity, is not easily treated by the ordinary smelter, and can, therefore, be used cheaply), and keep his process secret. With regard to the ores of Cornwall and Devon, they are seldom found to contain more than 2 to 7 per cent. of available metallic matter, whilst some of the foreign ores as much as 12 or 14 per cent. can be obtained. In the German ore, moreover, the metallic ingredients are of a more fusible character, so that when heated in the refractory furnace the earthy and metallic elements readily separate, the siliceous gangue with but little metal in it, except oxide of iron, rising to the top, and leaving a metallic compound of arsenic, nickel, &c., beneath. This latter, when carefully roasted in a reverberatory furnace, in contact with sand or ground flint, affords an impure silicate of cobalt, and arsenide of nickel, both of which are marketable products. Now, hitherto the great error made in respect to Devon and Cornish ores appears to be that insufficient attention has been given to the finding of a suitable flux; it has been concluded that because the German ores were of such a composition as to require no flux, therefore the English ores could be similarly treated without fluxing. Now, in the case of the Ashburton ores, which reference has already been made, the complete analysis was—Ferre oxide, 18.50; silica, 6.30; sulphur, 20.00; arsenic, 1.50; cobalt, 2.75; nickel, 3.50; loss, 0.95=100. Hitherto the ore has been regarded merely as an arsenic ore, while the necessary flux has been erected—burning-house, flues, &c.—for the manufacture of the arsenic all the other products, which appear far more valuable than the arsenic, have been thrown aside as refuse. It is regretted that no analysis of this residue has been made, for, judging the arsenic and sulphur volatilised to equal only 50 per cent of the bulk of the raw ore, the percentage of nickel and cobalt residue would be just doubled, and would stand—Cobalt, 5.50; nickel, 7.00=12.50 per cent., and would represent a much more valuable product to refine for nickel and cobalt. It has been very much remarked that iron cannot be procured by the ordinary process of the use of limestone, to render the alumina and silica of the gangue fusible; in copper smelting not only lime but fluor-spar is often used; in roasting lead ore lime cannot be dispensed with; and for the treatment of the Cornish ores nothing is required but a flux to afford a compound of arsenic, cobalt, and nickel per se, analogous to that procured from the German ore by mere fusion without a flux; so that the whole question really resolves itself into the discovery of a cheap material, capable of easy vitrification, and the matrix of the Cornish ore, and which is devoid of action on the arsenide of cobalt and nickel. The finding of such a flux for the purpose just mentioned would appear not to offer any insuperable difficulty. Beautiful pigments into the composition of which cobalt enters are familiar to most persons—cobalt-ultramarine, caeruleum, and green being especially brilliant. Cobalt-ultramarine, or Theobald's blue, consists of alumina and protoxide of cobalt. The pigment is prepared either by mixing solutions of alum and a salt of cobalt, precipitating the mixture by a solution of carbonate of soda, or by the decomposition of aluminate of soda by the addition of chloride of cobalt. The resulting precipitate, consisting of a mixture of hydrate of alumina and hydrate of protoxide of cobalt, is well washed, then dried, and heated for some time. This pigment when pulverised is very similar to ultramarine, but is a dirty violet by artificial light. It is, however, distinguished from ultramarine by its being affected by acids, as is copper or mineral blue; the latter is chiefly used in oil and water painting, and for

staining glass and porcelain. Caeruleum, which exhibits a bright blue colour, not changing in artificial light, consists of stannate of protoxide of cobalt, mixed in certain proportions with stannic acid and gypsum, and is not affected by heat, or the action of dilute acids or alkalis. In his translation of Wagner's "Chemical Technology," whence these details are taken, Mr. Crookes, F.R.S., gives the exact proportions, but in an article intended for general readers it is unnecessary to repeat them. Cobalt-green, which is also known as zinc-green and Saxony-green, is a compound similar to the cobalt ultramarine, but oxide of zinc is substituted for the alumina. This green is prepared by mixing a solution of white vitriol with a solution of a salt of protoxide of cobalt, precipitating by carbonate of soda, and washing, drying, and heating the precipitate. This pigment, when pure, contains 88 per cent. of oxide of zinc, and 12 per cent. of protoxide of cobalt; it is not affected by strong heat. The cobalt-yellow is obtained by mixing a solution of protoxide of cobalt with nitrate of potassa; it is a yellow crystalline precipitate, perfectly insoluble in water. According to Hays, this pigment is readily obtained by causing the vapours of hyponitric acid to pass into a solution of protoxide of cobalt, to which some potassa has been added. The whole of the cobalt is then converted into cobalt-yellow. As the nitrate of protoxide of cobalt and potassa can be obtained even from impure solutions of protoxide of cobalt so as to be quite free from any nickel, iron, &c., the use of this preparation of cobalt is preferable for glass and porcelain staining when a pure blue is required. Cobalt-bronze, a double salt of phosphate of protoxide of cobalt and ammonia, has likewise been lately brought into commerce; it is a violet-coloured powder, exhibiting a strong metallic lustre.

In the extraction of cobalt, then, we see that it is a chemical process that is usually involved, but the extraction of nickel is more directly metallurgical. Occasionally true nickel ores are met with, as in the case of Redwanskite, found in the Ural Mountains in Russia, but it is chiefly extracted from ores which contain it accidentally, such as certain species of iron and copper pyrites, the Mansfeldt ores, and others. An iron ore, found at Pragaten, in the Austrian Tyrol, has been profitably worked, although containing but 1.76 per cent. of nickel; yet, it is seen that in this country even 3.50 per cent. has been neglected. It very rarely happens that even the natural ores of nickel are sufficiently pure to admit of the direct extraction of the metal, and therefore, as is the case with copper, a preliminary operation is required, which aims at the concentration of the metal, either with sulphur when the combined substance is termed regulus, or with arsenic when it is called speiss, and it is one or other of these forms that the miners would in all probability find to be of the greatest possible advantage to bring the nickel into the market. One of the best authorities upon matters of this nature suggests that oxide of iron would probably be found the most suitable flux for using with the Cornish ores containing nickel and cobalt, and he considers that by this means, a manufacturer accustomed to furnace operations would probably be enabled to send into the market an arsenical compound containing more than 50 per cent. of the nickel. In the subsequent process the powdered speiss is roasted to expel the arsenic first by itself and next with the addition of charcoal powder, till the garlic smell be no longer perceived. The residuum is mixed with three parts of sulphur and one of potash, melted in a crucible at a gentle heat, and the product being educated with water leaves a powder of metallic lustre, which is a sulphide of nickel free from arsenic, while the arsenic associated with the sulphur and combined with the resulting sulphide of potassium, remains dissolved. Should arsenic still be found in the sulphide, as may happen if the first roasting heat were too great, the process is repeated.

Pure nickel has a nearly silver-white colour, with a slightly yellowish line, is very difficult to melt, rather hard, very ductile, and easily polished. When quite pure it may be drawn into wire, rolled into sheets, hammered, and forged; and in combination with copper and zinc in varying proportions gives the beautiful silver-like alloys so familiar to many as German silver, although called by various names, according to the caprice of the manufacturer. The great necessity for the removal of the arsenic arises from the fact that if any be allowed to remain the nickeliferous alloys speedily turn brown upon exposure to the air, yet want of whiteness must not always be attributed to the presence of arsenic, for but very little variation in the proportions of the metals forming the alloy will change it from one scarcely distinguishable by the eye from silver to a comparatively worthless one; and, indeed, the difference seems to depend sometimes upon mere difference in the method of mixing. Thus the fine Argentine plate and the oriental packfong, which is little better in appearance than pewter, are each described as consisting of—copper, 8 parts; nickel, 3 parts; and zinc, 3 parts. When the proportion of nickel is increased the alloy is much harder and more difficult to work, whilst the colour is not materially improved; and when the proportion is much diminished the colour is usually deteriorated; yet one manufacturer employing copper 60.0, zinc 17.0, and nickel 23.0, succeeds in producing a very fine alloy.

That the ores of Cornwall and Devon usually require somewhat special treatment when it is desired to obtain the nickel and cobalt in marketable form is well known, but as the difficulties to be overcome are certainly not greater than have already been overcome by Swedish and German chemists, there can be no reason why nickel and cobalt should not appear for much larger figures than we have been accustomed to see them in the mineral statistics of the kingdom. The particular Ashburton ore referred to was merely mentioned because the analysis happened to be at hand, but there are, doubtless, many others procurable in the western counties which, although, perhaps, containing a smaller percentage of nickel and cobalt, could as readily be made commercially remunerative. Asbolane, cobaltite, erythrite, and smaltite all occur in the districts named, and are all recognised as cobaltiferous minerals, whilst of nickeliferous minerals the Cornishmen have annabergite, millerite, nicolite, and pentlandite. The latter mineral is, no doubt, often passed by at Wheal Jane, upon the supposition that it is magnetic pyrites, which it much resembles; but it is probably the annabergite and nicolite which represent the nickel ores of the greatest commercial value; and as the cobalt ores usually occur in the same mines and under very similar conditions, there is every inducement to use care that they may not be wasted. All that is required is a metallurgical chemist to give the same amount of attention to nickel and cobalt as Dr. Robert Oxland gave to wolfram, and then many

ores which would now scarcely pay for dressing may be made to contribute largely to the profits of the mine adventurer.

NICKEL—MANGANESE ALLOY.

Referring to the statement which appeared in last week's Journal, the well-known authority, "Y," writes to the *Times*:—"You informed the public that the price of the metal nickel is unprecedentedly high, and have suggested the probability that it will be much higher. This metal is an essential constituent of the white alloy called German silver, which, during the last 30 years, has been largely used in the manufacture of articles electro-plated with silver. The alloy is composed of about two-thirds of copper and one-third of spelter and nickel, in proportions varying according to the quality required. It is, in fact, white brass, of which the spelter is partially replaced by nickel, the proportion of copper always remaining the same." It is preferred to copper or brass for the purpose above mentioned, because, owing to its whiteness, the removal of the superficial coating of the electro-deposited silver by abrasion in the course of wear does not become manifest. Nickel is also a constituent of monetary alloys of several nations, and quite recently works have been established for coating objects of brass, iron, &c., with nickel by electro-deposition.

With your permission, I will now disclose, for the first time, a fact which may, perhaps, surprise, and will certainly interest, electro-platers. More than 20 years ago I was engaged, at the largest German silver works in this country, in an investigation which had for its object the discovery, if possible, of a substitute for nickel in German silver. The result was successful; every difficulty was surmounted, and an alloy was produced on a manufacturing scale, which so perfectly resembled German silver that it was sold as such by way of experiment to electro-platers accustomed to the use of that alloy, without their discovering any difference between the two. The substitute was the metal manganese, and although this cost very much less than nickel, yet it was decided for commercial reasons not to proceed further in the matter, the manufacture of German silver being at the time highly remunerative. The firm to which I have alluded has it in its power at any time to introduce the manganese alloy, and if it should be unwilling to do so it will certainly be done by other persons. At present I refrain from making known either the composition of this alloy or the details necessary to guide the manufacturer, though it is my intention to publish both on a future occasion. What I here announce will, I trust, serve as a hint to practical metallurgists, and may induce them to work at the subject."

IRON MINING IN CORNWALL.

SIR,—I have noticed a letter signed "Vigilans" in last week's Journal on the subject of Iron Mining in Cornwall. No one reading it can fail to be struck with the truth of the concluding paragraphs of his letter, and mining would become a far more legitimate investment than it is at present if the public took ordinary precautions in their own interest. I happen to know something of the St. Stephen's Hematite Iron Ore Company, whose mine "Vigilans" quotes as yielding good quality iron ore. The company was formed and registered last October; the directors, I believe, are the principal shareholders, and the acquisition of the mine was on the following terms:—The vendor received nearly his entire interest in fully paid-up shares, which do not rank for dividend until 10 per cent. has been paid to the other shareholders. This showed confidence in the undertaking, which, from what I know, is not likely to be misplaced. The gentlemen on the board are all highly respected business and practical men, the Chairman being Mr. R. O. Burkle, of Mincing-lane, London, who is also the Chairman of the Stranton Iron and Steel Company. In the interest of iron mining in Cornwall, I am happy to be able to speak well of an undertaking which promises unusual success.

St. Austell, May 6.

THE MINERS AND THEIR LEADERS.

SIR,—In a leading article in the Journal of April 26, on "Miners and their Leaders," you praise very highly a number of gentlemen—agents of the National Association of Miners—with whom I act very cordially, and all of whom I have the honour personally to count amongst my friends. I also agree with you very cordially in all you have said in their praise; and if you had gone much further in the same direction, knowing these gentlemen as well as I do, I should have gone with you.

Nor do I grumble at the dispraise you have thought proper to bestow on me. It is true I am "comparatively" a young man, being only 38 years old; men of 70 are "comparatively" older. I may be "glib of tongue," it is a common disease, though not quite so bad as "glibness of pen." I may also be devoid of "anything in the shape of originality," and if sent to Parliament I may become the "laughing stock of the House of Commons," and my name may become "synonymous with imbecility." What will be, will be—and neither your wisdom nor my folly can prevent such from being the case. I do not offer even to improve my mind if you will try to amend your manners; both may be impossible tasks. What I desire to point out is that no amount of intellectual smartness compensates for a disposition to make intentional misstatements. You know that the Strike in South Wales was not a "signal failure." You cannot but know that it was a "signal success." You know also that the employers asked for a reduction of 10 per cent. for three months that they might work off orders taken—as they said—at a price too low to afford existing wages; and you know, in addition, that the men only agreed on the Monday, at one works; Tuesday, Wednesday, Thursday, and Saturday at other works; to go to work on the following Monday at old rates, and that not a worth of those orders were worked off at reduced wages. You know, or you ought to know, that the three days, on an average, conceded by the men were not a half or a quarter of the time needed to prepare for the commencement of regular ordinary work.

I cannot even guess at the motive you may have for abusing me. You have a good opportunity in your own Journal to do so, and I do not in any way prohibit you. If it serve you, and does not injure me, it would perhaps be as well if you continued to now and then

THOMAS HALLIDAY,
President of the Amalgamated Association of Miners,
British Coffeehouse, Agar-street, Strand, May 6.
[Some remarks on this communication will be found in another column.]

This transparently inconsistent statement is followed by another, the effect that "to show whether he profited by the information the cave and flooding of the mine, he would say that his agent, Mr. Park had started for Utah, being unable to get any orders information from him, and getting reports from their adversaries Utah, *became frightened, and sold 1400 shares at an average of 132,* and these were the first and only shares that he had sold after his leaving England. As soon as he was advised of his action by cable he ordered him to stop selling, and within two or three weeks re-purchased the shares at a loss of 6*l* per share, or 8400*l*." This clearly

Capital.	Name of company.	No. of shares.	Shares.	Paid up.	Last div. without.	Total amount paid.	Closing prices.
£	DIVIDEND-PAYING MINES.						
415,000	Band of Hope and Abiloin Consols	22,450	£20	£20	3s.	£305,021	£1 10s. to £1 13s.
25,000	Band of Hope and Abiloin Consols	12,800	20	20	2s.	36,460	£1 11s. to £1 13s.
44,800	Band of Hope and Abiloin Consols	12,800	3½	1½	—	—	double issue.
50,000	New North Glauco	2,400	20	—	—	270,306	£275 to £278.
12,000	Long Tunnel	2,400	25	5	—	—	£275 to £278.
15,000	Walthalla	2,400	25	—	2	127,526 92 24	£275 to £278.
75,000	Victoria Gold Mines	30,000	2½	2 3s.	—	59,500	£1 10s. to £1 13s.
13,213	Garden Gully United	26,427	—	—	2s.	10,660 1s 9d	£1 10s. to £1 13s.
10,000	Golden Fleece	20,000	½	3 1s.	—	41s 3d. p. sh.	£3 15s. to £3 17s.
20,000	Golden Fleece Tribute, No. 2	24,000	¾	nil.	9d.	3,300	7s. to 8s.
20,000	Great Extended Husker's	28,000	1	¾	—	186,900	£11 15s. to £12.
14,000	Great Extended Husker's Tribute	28,000	1	¾	—	161,000	£11 15s. to £12.
28,000	Hercules	3,200	35	31½	—	6,300	64s. to 66s.
112,000	Koh-i-noor	24,000	1	—	—	—	18s. to £1 2s.
24,000	Rose of Denmark	24,000	1	—	—	—	£22 to £24 5s.
20,000	Union	20,000	1	—	—	—	17s 6d. to 18s.
16,000	Walthalla	32,000	3½	—	—	23,500	16s. to 18s.
4,500	Cornish Daytford, per 130th=10 shares	1,300	3½	2½	10s.	—	12s. to 14s.
8,000	New Chum Victoria Tribute	3,800	6	27. 3s. 6d	—	—	£250 to £280.
4,000	New Chum Victoria Tribute	3,800	6	21½	—	22,000	£24 to £42.
54,000	Old Chum Freehold, per 50th=6 shares	27,000	2	—	—	—	£3 to £4 10s.
54,000	Old Chum Freehold, per 50th=6 shares	27,000	2	—	—	—	£1 6s. to £1 10s.
30,000	Band of Hope, Maryborough	45,000	1½	1	—	46,912 10s.	13s. to 14s.
67,500	Lazarus Co.	45,000	1½	1	—	34,500	13s. to 14s.
67,500	Lazarus Co., No. 1	45,000	1½	1	—	—	29s. to 30s.
32,000	North Johnson's	22,000	1½	15s. 9d.	—	—	19s. to £1.
32,000	Shenandoah	22,000	1	1s.	—	1,400	14s. 6d. to 15s. 6d.
28,000	New Chum and Belle Vue Railway Reserve	28,000	1	6d.	—	—	£4 to £4 3s.
77,000	Johnson's Reef	28,000	2½	27. 9s. 6d	—	—	—

* £8000 reserve fund.

Under these circumstances many persons who from poverty are unable to perform the requisite \$500 worth of improvements thereon are offering an half-interest in their lodes as an inducement to capitalists to accomplish for them the necessary amount of work on the

Slate Quarry Management under "Limited Liability Companies" was the subject introduced to the *Mining Journal* of March 13, with an expressive wish on the part of the writer to serve the shareholders in such companies. With an ardent desire I have perused the *Journal* ever since for the much-desired information, but hitherto nothing has come forth in reply to a few questions in the *Journal* of April 5, or otherwise. What I have observed as tending to wreck most slate quarry companies in Wales is the first loss or owner of the quarry succeeding in having himself registered in the Articles of Association of the company as "the manager," and consequently the whole power of controlling the development and working the quarry was entirely vested in himself, while he came on in lavishing the company's capital by driving useless tunnels, and removing unrequired top rocks, which has disheartened many a shareholder, and caused the works to revolve into the original channels, which in a very short time after paid good dividends.

Capel Curig, May 7. ————— W. E. PARRY.

SIR,—I noticed a letter in last week's *Journal* from Mr. Sturgeon, called last fall, when I found him in a very desponding state, saying some Cornish wag had persuaded him to fix the boilers over the cylinders, and when he came to work the water from the boiler drowned the steam in the cylinder. I had seen quite enough of a badly constructed thing, and I left. When I called again I thought I have found it in full work, but it was all still: I did not open the window to see it, but to me it had the appearance as though the large boiler had eaten up the cylinders, great head and all. I took retreat at once. After I got out I asked a man why it would not work, when he said it burnt more coal than it had stamped steel, and then it got stalled, and would not move, when I set it down for a lazy horse and left, thinking little of Mr. Sturgeon or his machine.—*Wadebridge, May 8.* ————— N. ENKOS

Sir,—In my last I nearly finished with the class that should be selected to learn Nature's laws, and to become mine agents; but they have a deal more to learn to become experts for all mine work, to meet every-day professionals. But their best division of labour is to master all underground portions of work. It is there that Nature's laws are to be learnt. The next grand point is to learn the law of shifts and heaves of lodes by intersection, and what direction of lode, and what angle of lode, shifts most. They will find that the oblique angle will make the greatest shift, and particularly if one is near to north and south, is of a soft or clay character. Right-angle crossings but seldom shift lodes far, if one is not a large and powerful clay one. A large clay east and west lode will often shift off a smaller one that runs north-east and south-west. Then, the dip of the lode may alter the move, as they have to do with the shifts. Notice all the shifting lodes in every district, and the distance between the shifts. All shifts go to the point of the **A** on all master cross lodes that shift other lodes. A small cross lode between may appear different, but the large **A** or **V** carries the lode nearer the point. This law is well defined in the shifts of coals, where every layer of coal is known. Metallic veins are often so much alike that one is taken for the other: it is but seldom so with coal shifts, but all the bearings of every lode and the shifts should be taken down, and what did actually occur between all lodes. Slides are often composed of clays; they shift lodes. Notice all the veins, with their shifts: whether on the lodes or elvans they should be correctly noted down, showing the bearing and dip of each, with the shift, and about what quantity of ore formed near each, and if the elvan is soft or hard, and if it hardens as it deepens, and as near as it can its contents are as can be got at. Learn to know sulphur rock from arsenical rock. Tin associates with arsenical ore, but does not mineralise with it. Sulphur mineralises with every paying ore in Cornwall and Devon but tin, and slightly in manganese. Learn to know when you walk in any land, if you can see the rock, if it is a mineral-bearing one. Learn to know when in the mine, by the slide thrown out, if it is from sulphur or arsenical ore. A keen eye will detect the difference. If mixed it is difficult to detect. If the mine is going into arsenical ore a keen eye will see the difference when it becomes master. I reported on Devon Great Consols 20 years ago, when the mine was in its palmy days, that it would go into arsenical ore in death. My report did not suit generally.

men, what did it do? Was I right? Most reporters wind up their reports, even if they have not been in a mine five times during their lives, with the words "The rock is highly mineralised," but they never tell us what with. I should like to know what rock is not mineralised, as many are mineralised with that which damages them, and they never make paying mines.

N. ENNOR.

Wadebridge, Cornwall, May 7.

ENNOR.—In Mr. Ennor's letter in the Supplement to last week's Journal, p. 498, "Wadebridge, Cornwall, May 7," read "Stannary Law."

YOUNG ASPIRANTS LEARNING NATURE'S LAWS.

ENNOR.—As the numerous and lengthy effusions of your correspondent, Ennor, occupy a good deal of valuable space, might I venture to suggest that he should in future adopt a condensed categorical form of enlightening his benighted countrymen? Thus, the substance of his half-dozen letters "To Young Aspirants on learning Nature's Laws, and who should be Mine Agents," might have been given in a few questions and answers as the following:—

Q. Who should be mine agents?—A. Men possessing practical knowledge.

Q. Who are they?—A. Those who have observed for themselves while beating the borer and tramping the stuff underground.

Q. Is it an advantage to be acquainted with the peculiarities of the districts than a man can himself visit? or to know what the districts have done?—A. No; it is rather a disadvantage, since this is "theoretical" knowledge.

Q. In brief, what qualifications should mine agents possess?—A. They should not have attended a Government school; should be totally ignorant of the merest rudiments of mechanics, geology, mineralogy, chemistry, and all other physical sciences; should have a facile but ungrammatical pen; a habit of jumping at conclusions; an overweening conceit of themselves; and, above all, a belief in "Practical" and "practical" knowledge.

Q. What, then, is practical knowledge?—A. That which is known by the eminent practical Mr. N. Ennor, plus his vague guesses.

Q. What is theoretical knowledge?—A. Everything which is known to Mr. Ennor, or which contradicts those guesses.

Q. What notable mistake was made by the late Prince Consort?—A. The appointment of Mr. W. W. Smyth, F.R.S., instead of Mr. Ennor, as Professor of Mineralogy and Mining at the Government School of Mines.

Q. What has been the result of this unfortunate appointment?—A. To throw back the knowledge of "Nature's Laws" some 20 years.

Q. To whom are these laws now known?—A. To the eminent Mr. Ennor.

A. H.

PARKYN'S "SAVE-ALL" TIN-DRESSING FLOORS.

ENNOR.—In last week's Supplement to the *Mining Journal* a letter appeared signed "Mine Agent," and from his remarks he is evidently alarmed by the remarks of "Plumbum Album" and Mr. John Walker on tin-dressing, and the spalling down the tinstone to its proper size for the stamps, &c. Now, in reply to "Mine Agent," I beg to inform him that I never saw Mr. John Walker, nor have I ever written or received a letter from him, neither have I any business connections with him in any way whatever, neither do I know who "Plumbum Album" is; but from their writings I shall say that they are gentlemen well up in their business, and know what they are writing about. "Mine Agent" goes on to say that upwards of 40 years ago he was, amongst a number of other boys, employed in spalling ores for the stamps at North Roskear Mine; he also says since that he has advanced to the mining of ores, and thence onwards to the giving directions concerning the manner of mining, and the arrangement and erection of stamps-floors, &c.—in fact, his statement of himself is wonderful, and how proud he must be in his position. I wonder he does not think he is, like the Pope of Rome, infallible; and after so much experience he must be the man that should be consulted and his ideas supported, and one can't go wrong; but alas! tin is washed away in immense quantities under the very eyes of his Argus, not from one mine alone but from many; inasmuch as fortunes have actually been made by saving the tin after it had passed the tin-dressing floors from several mines, and Mr. Ennor some time since wrote and said that the tin leavings now on the sea beach were worth 20s. per ton for tin, and that there was immense quantities there. Now, this tin had passed the mines' dressing-floors, and also had escaped those below waiting for it, notwithstanding the large quantity they did save. Now, I ask "Mine Agent" does he not know this? Then, after such experience as he would have as believe he has had, I say he has not done his duty to his employers in allowing all this waste of tin: if he is connected with one of those mines where the tin has been allowed to escape, or even if he is not, he should have given good advice to his neighbours.

One thing he has forgotten to mention—that is, the stamps grates or the size of hole in the grate; and I am inclined to think that this is the sore point with him, my mentioning about a certain mine using 88 holes to the inch, whereas it should be 25; but since my letter the number of the holes in the grate is reduced, I am informed, to something like 40, but it must be more yet. From "Mine Agent's" writing, I think he does not reside 40 miles from Camborne. The other day, when a person was asked about my "Save-All," the reply was that it was as old as the hills, I am informed. Now, I beg to say that a greater untruth was never spoken, as he never saw my plan fully carried out below Truro, and no doubt he, after so many years' experience, would be unwilling for my floors to be got into general use, as he may be interested with those below the mines waiting for the tin coming down. I ask "Mine Agent," where can he find hoppers, like those shown in my plan, in which the water is brought to bear? And it does not matter how much slime may be in the hopper, the water will commence carrying the tinstuff into the boulders with such regularity, and not like many mines, where the hopper is partly filled with slime, and the water is stopped back till it reaches over the slimes, when it rushes away with such force that it carries away the tin by wholesale; as it will be seen, the water stopped back for some considerable time, and when it reaches over the top, it will increase in force as the slime is carried out of the hopper. Strange as it may appear, this is really the case. Then the life-rack, which will dispatch the slime at such rate, which "Mine Agent," in my opinion, knows nothing of whatever. He appears to be well adapted to live in China—to do as his fathers did, and never study any improvements. Indeed, what is his letter, and what is there in it? Why does he not publish a diagram of his floors, and why does he not save all the tin? For this reason, the principle is wrong. This must be the cause. I beg to remind "Mine Agent" that I do not want to be built up at other people's expense. Far from this, my only wish and desire is that gentlemen coming into this county investing large sums of money should reap such a reward as they richly deserve, and not have the tin washed away after it is sent to the surface.

I also ask "Mine Agent" what kind of floors they had at a certain tin mine in which calls were made on the shareholders for some time, when the mine was suspended, and Mr. John Thomas, the well-known auctioneer, was called in to sell the mine, and to his surprise he found 70000. worth of tin under the floors, boards, and about the mine, &c.? Is this the kind of floors that "Mine Agent" has been erecting? If so, he had better recant at once. These floors could not be the "Save-All." I say without fear of contradiction that improvements are wanted in tin-dressing, and that my plan will answer the purpose. I do not care whether it be large, round, or some tin of the finest quality, and that I am prepared to erect in any mine in Cornwall, behind the dressing-floors, after the slime has passed the mine-floors, and show what tin I can save. Another important feature in my "Save-All" is that the floors can be erected at least 50 per cent. less than most other floors, and the tin dressed at least 40 per cent. less in floors' cost. I beg to inform "Mine Agent" that I have had 30 years' experience in mining in all its branches, having had to contend with hard and soft ground, and am quite prepared to meet "Mine Agent" on any subject on mining whatever, be it underground or above. Of course, I do not know who he is, neither do I care.

Next week, by your permission, I will send you particulars of a certain tin mine which I laid out, and the tinstuff near the surface contained only about 4 or 5 lbs. to the ton, and the amount of tin

sold monthly was about 5 tons, so that it will be seen a large quantity passed the stamps to get 5 tons of black tin per month. The dressing-floors were as near as possible to my "Save-All," and notwithstanding the large quantity sent through the stamps, the tin dressing cost, including the head tin dresser (4l. per month), did not exceed 2l. per ton of tinstuff to market, but it could not be done if any floors are like some I could mention, where they have to wheel all the stuff in a wheelbarrow for some distance, it would have taken all the tin to pay for dressing, but in the case I refer to we had a steam-engine at work, and we were sinking the engine-shaft and laying open the mine generally, and made a profit of over 1000. per month. I should say that 12 men supplied the tinstone, the mine being opened in accordance with my views. I say again that any unprejudiced person seeing such glaring reports about tin being washed away would say that it is time it should be stopped.

I can also mention the name of a certain mine where the floors were laid out on my "Save-All" plan, but afterwards altered, and since the alterations they have not raised tin enough to pay for half of the coal consumed. My opinion is if the mine be properly conducted it would pay cost, but never will by the present mode of working. How long will shareholders be pleased to go on like this? Roche, St. Austell, May 9.

THOS. PARKYN.

TIN-DRESSING—PARKYN'S "SAVE-ALL" FLOORS.

ENNOR.—I have read with some interest Capt. Parkyn's admirable letters on tin-dressing. I think his "Save-All" floors the most perfect of their kind that have ever come under my notice, and I have seen a few; they recommend themselves for their simplicity of construction and economy in working, as well as their save-all properties, which no one who has studied the subject can gainsay. Capt. Parkyn deserves the thanks of all interested in tin mining for making his plans public, and I cannot too strongly deprecate the abuse which "Mine Agent" ineffectually attempts to launch at Capt. Parkyn for modestly trying to give his neighbours the benefit of his experience. Of course "Mine Agent" has a perfect right to his opinions, and no doubt, he is a good man in his place, which is, evidently, not on tin floors. It must be so long since he was a little boy that he has forgotten what he learnt then, or he may be a dweller in the "Red River" territory, and thus write feelingly against "Save-All" tin-dressing-floors; but success, I say, attend Capt. Parkyn and his floors.—May 8.

A TIN MINE PURSER.

OLD TREBURGETT SILVER AND LEAD MINING COMPANY.

ENNOR.—In last week's Journal Old Treburgett sampling was given as—4 tons of best ore, 10 tons of second. It should have been—24 tons of best, 10 tons of second. This ore has been sold to-day for the sum of 9100. 19s.

The returns are steadily increasing, and the mine is opening up very satisfactorily; but I am not responsible for any puffing notices that occasionally appear from zealous correspondents. The mine requires no puffing.

F. R. WILSON, Secretary.

St. Helen's-place, May 7.

CASTLE-AN-DINAS.

ENNOR.—Having noticed with some concern that during the past few weeks several attempts have been made to greatly depreciate the shares of this valuable mining property, I have, at some trouble, recently taken steps to ascertain whether any unfavourable change in the mine had given grounds for the interested action of the "bears." I am greatly pleased to be able to announce to my fellow-shareholders that there is not the slightest cause for them to part with their shares, my advice to them is rather to double their interests, if they can do so (which I don't say they may). I think, have little fear while it remains at anything like its present price. The old mine has been changing its coat, and being renovated from top to bottom, not omitting the placing of new stamps, they have managed to keep up good returns monthly, and will be able shortly, I am informed, to sell 7 or 8 tons of tin per month. I consider dividends are safe for a good time to come, and if the company is valued at its intrinsic value we should see the shares worth 30. or 40. each, at no great lapse of time from the present. To assist in bringing this about I would suggest that the offices be removed at an early date to London, and that the secretary, Mr. Whitfield, cease issuing shares, except at a premium, which they are honestly worth. We all of us receive with confidence the thoughtful and prudent reports of Capt. Symons, although some weeks were disappointed, and have no reports, and now and then we should like to see them longer, and enter more into the nature of a resume, at the same time a report occasionally from an independent captain would do good service. Why not, too, announce every month the result of the tin sales? I hope my suggestion as to removing the offices will not go unheeded; St. Columb is one of the most inconvenient places in the world to reach, and as there are few Cornish shareholders, the only benefit has been a form. As I know this mining property can stand the test of a searching investigation, I have not scrupled to speak my mind rather plainly.

SHAREHOLDER.

TERRAS MINE.

ENNOR.—On the 30th ult. I posted a letter to you for insertion in the *Mining Journal* of the 3rd inst., in reply to one from "Japhat," of the 26th, which letter I find has not reached you. Having no copy of it, I write this for insertion, if you please, in your next number. In the first place I wish to assure you, and that writer, that I entertain neither hatred nor envy with respect to him. He complains of "personalities." How could I be personal, when no name was mentioned? There is more than one broker in Gracechurch-street. But the "cap" fitted him so exactly that he put it on; and then in a spirit of revenge vented his spleen in real personalities.

I have not time to waste in unprofitable correspondence, but I cannot refrain from a few remarks on "Japhat's" notable letter. *Perseus* in composition is of first class importance, because it is that quality which enables the reader to comprehend the writer's meaning; but some people write so though they want only to conceal their meaning under a cloud. "Japhat" commences his letter thus:—"With a flourish on the proverbial penny trumpet, Mr. R. Symons did this round old world the honour of making his bow to it in the columns of your last week's edition!" I cannot see what he means, but I suspect he means something bad, or intends to convey something ridiculous. I will ask him the favour of telling your readers, next week, what he meant to convey to them in that sentence. Meanwhile, I beg to state that I possess no "penny trumpet," that I never heard of a "conventional" penny trumpet, nor of any "proverb" in connection with such a trumpet, or that a number of a newspaper is called a "penny trumpet." Every number of a periodical is supposed to contain fresh matter; and, therefore, is not an edition like the re-publication of a book with or without emendations. "Japhat" admits the equity of the Divine command of loving his neighbour as himself. How far he has observed that command I will let his conscience determine.

With regard to Terras shares, he speaks of purchasing them on their "merits;" by that he means, I suppose, 10. per share, the original price mentioned in the prospectus. Well, I see no wrong in that, but the wrong consisted in selling on their "merits." I mean that he exaggerated their value so as to raise the price to 30. per share, equating it to 75,000. for the whole, an unwarranted price. To convince your readers of the propriety of my allegations, I purpose to send to you for insertion, in a future number, extracts from "Japhat's" advertisements of Terras shares, by the sale of which he has realised such a fortune, and on account of which he thinks that I envy him. I envy no man, especially a man who gains money in that way. He speaks of the "intrinsic value" of the shares, I suppose that he is a believer in Butler's dictum:—

"The intrinsic value of a thing."

Is just as much as it will bring. If, by gliding a shilling you pass it off amongst sovereigns as a sovereign, in payment or exchange, the receiver has no "intrinsic value." Many years ago I purchased a seal as a gold seal for 38s. After a little wear I discovered the imposture, for there was only a tin coating of gold, so I had no intrinsic value. If a broker, by persuading capitalists to buy shares, by representing the certainty of early, large, and continuous dividends, it is little better than obtaining money under false pretences, when he has no data on which to found his statements. Terras never justified such statements as those which appeared in your Journal, as the experiment has proved. But "Japhat" has the cash, and he does not concern himself for the unhappy credulous investors. I have had reason to believe that in many cases non-existent ideas have been inserted by them, and printed by me. Some blame having been cast on me on that account, I purpose in future, when I print plans for customers, to subjoin the following note:—"I do not hold myself responsible for the number or accuracy of the ideas delineated in this plan.—R. SYMONS." This I have been advised to do, so the "marvellous superiority" shall be ascribed to the real authors. As to my antecedents, I beg to state that they will bear investigation, as will those of my ancestors. Not one of us was ever bankrupt, or insolvent, or imprisoned for debt, like some brokers have been. The abolition of imprisonment for debt is a great relief to brokers, for Whitecross-street was the occasional residence of some of them.

Why the occult "Japhat" has associated my humble name with that of Jeremiah, I know not. I never heard that that illustrious prophet was a "mappist." I wish that I could consistently place "Japhat" in similar society; but unless I alters his course of life I see no better society for him than that of Annanias and Sapphira, and Judas Iscariot, in a place which a clergyman on his said he "did not like to name before his polite audience."

No doubt "Japhat" is *Japheth* misspelt—an orthographical error.

R. SYMONS.

"THIS ROUND OLD WORLD."

ENNOR.—A writer who, it seems, did not know how to spell his own name—for he wrote "Japhat" instead of *Japheth*—used the words quoted above in a letter under the heading of "Terras Mine," vide *Mining Journal* of April 26. He is a believer in the rotundity of the earth. It may appear to some readers that "Japhat" had no occasion to say that this world is "round"—the fact being so generally admitted. In early ages the world was supposed to have a flat surface, and this was a childish belief. I believed that it was very possible to go to the extremity of its flat surface and *fall down*—I could not tell how far! But in this age of knowledge physical geography is better understood; yet, even now, there are some persons who do not believe the world is round. I dare say you will remember that, a few years ago, a gentleman offered to give 5000. to any man who could demonstrate the rotundity of the earth, and he referred the decision to some one of his own nomination to determine on the sufficiency of the evidence. The proofs were forthcoming, and were regarded as incontestable by all except the gentleman in question, who, because he was not convinced, said that the decision was *unfair*! It is wonderful how strong prejudice is in some minds. But "Japhat" is correct in his belief in this particular—the world is round. The world is also old; how old I cannot say; I request the favour of the information from that elegant writer.

J. B.

LONDON MINE MANAGEMENT.

ENNOR.—I note that at the meeting of a company in which I am interested it was resolved to increase the present committee staff, and, consequently, the monthly cost. Surely, in small concerns like the one referred to, without any additional operations being carried out for a long while past, and assuming the sinking of the engine-shaft perhaps half-a-dozen hands more, the former committee ought to be sufficient. Here, with dividends in abeyance twelve months, and no very flattering prospects of an early change for the better (the returns just paying the monthly cost), we have a committee of four, a secretary, purser, and two agents, to control and rule probably a hundred hands underground and at surface, and the small extra duty of paying a few merchants' bills monthly.

I am informed that the London expenditure for the committee, secretary, &c., is merged in the four months' financial statement presented, with labour pay, &c., on the mine. I would suggest to London executives that it will be more desirable to state these charges separately in their next statements, classifying and showing the London expenditure distinct. It does not appear, so far as I can learn, the usual course to include their salaries, &c., under the head of "labour pay."

A SHAREHOLDER.

"CIRCULAR MINING"—DIRECTORS.

ENNOR.—During the last three years a number of mines have been floated in England, America, and other parts of the world which, to say the least of them, were neither more nor less than "swindles." I could name more than a score. Half-pay capitalists, colonels, and various directors selected from the upper ten and commercial circle were placed on the board, and every possible means were taken to delude the public in order that such schemes might be floated, even so far as to introduce foreign metal into the mines in order to effect the attainment of the object of the promoters. It is to be regretted that directors should, without first satisfying themselves as to the bona fides of a mine or any other scheme, lend or sanction their names, without first either examining, or causing to be examined by experts, mines of a doubtful character. Fully two-thirds of the mines floated are paid for by such men as *bona fide* capitalists, and even noblemen, whose knowledge is superficial, for they have not penetrated the depths and undergone the various trials of an expert miner, even by submitting to be shown the lodes, or even the ground plan, of the mine, with its geological formation. Yet these parties receive their salary of from 3000. or 4000. each without even sacrificing, so far as *bona fide* shares, one-tenth of the said salary, as they, in order to secure their influence, receive either directly or indirectly given shares, together with a seat on the board, which gives the public outside an idea that the affair is as stated in the prospectus, and verified by such men as *bona fide* capitalists. Being one of those who have had an insight into such undertakings, to my sorrow, I could name too many who receive mining circulars, &c., to studiously avoid being tempted into any mines which are not provided over by directors who receive no pay until 5 per cent. is legitimately paid out of profits realised from the mine they preside over, and verified by accountants and engineers of known reputation, as we have in the railways and gasworks.

"Circular Mining" and various other schemes would then stand the test of genuineness, and save thousands from investing in rotten affairs, which mostly end eventually in ruin to the investor and the legitimate interest of those who unfortunately may be guided by circumstances for a time.

X. Y. Z.

WHEEL ROME.

ENNOR.—In last week's Journal I observe an enquiry respecting Wheel Rome. The mine in question, yet in its infancy, is situated in the west of Cornwall, on the Cornish coast, close to Hayle, and was worked by a small party of adventurers, when a fine lode was cut, and silver-lead of rich quality raised and sold. For some reason which I am unable to explain the working was suspended for a time, and in consequence, I believe, of the death of one or more of the principals was never resumed. Operations were commenced on this mine in August last, principally confined to clearing the adit levels, and opening the mine, with a view to erecting an engine and the necessary machinery for vigorously prosecuting the adventure, and since Jan. 1 a considerable quantity of rich silver-lead and blende has been raised and sold, the lead having realised from 25. to 25. per ton, and it appears to be a very promising speculation. I have seen a report from Capt. Wm. Teague, of Tincroft, who inspected the mine a few days since, which speaks in the highest terms of the mine, and I may quote a short extract for the information of "Enquirer." Capt. Teague says—"It is above an ordinary speculation, being in such a mineral-bearing district. * * * I broke some very splendid stones of lead to-day in the slope at the back of this level (the eastern), also blende and copper; it certainly has a very kindly appearance, and warrants the erection of an engine," &c. It is a *bona fide* undertaking, and the purser is Mr. Vivian, of Rose Hill, Camborne, close to the mine; the manager is Captain Wm. Bawden, who is manager of the English Arsenic Works, Roseworthy, near Camborne, formerly an agent at Camborne Veau and other mines, and an old miner of over 35 years' experience, who has a very high opinion of this sett. "Enquirer" may rest assured that whatever is done in this undertaking will be done with a view to making it a paying concern, and the names of Mr. Vivian and Capt. Bawden are a sufficient guarantee for the legitimacy of the speculation.

INFORMANT.

Camborne, May 5.

FRANK MILLS.

ENNOR.—The rise in the price of shares during the last few days conclusively proves the correctness of the views of your various correspondents in the *Mining Journal* during the last six weeks. The mine is now apparently at the point of becoming one of the largest iron-producing properties in either of the counties (Devon or Cornwall), and will be able to bring into the market immense returns of ore at the cheapest possible cost, by reason of its excellent appliances, machinery, and tramways, all of which are in first-rate order. I do not enter into the question of the value of the sphatose iron found in masses in the levels, but assert that it is well known in Exeter and elsewhere to be of great value, and as asserted by several of your correspondents to be a happy piece of intelligence just comes from the mine at this time—that the water is decreasing materially, the engine working under four strokes per minute, and is still decreasing, so that with the falling price of coals the mine can be pumped for a trifle. It will certainly be beyond my comprehension as a speculator if Frank Mills Mine does not carry off the mining prize of 1873, which I believe will be the best investment at this time, and is well qualified in chances to turn up riches in lead as well as the former ore. That it is improving in lead is a substantial fact, and not three years since stood at 8. per share without the iron ore, in which it has proved so wealthy. There are 300 fms. of virgin ground in the western part of the lode yet to be explored, and well known to be rich in lead on the best authority of the most practical men, and the 45 and 60 fms. levels are being driven on (say) 50 fms. at outside, when cross-cuts will at once prove the lode, and open up valuable returns.

A WELL-INFORMED ONE.

Seamers, May 7.

WHEEL VINCENT, ALTARNUN.

ENNOR.—In the Supplement to your valuable Journal of April 26 is a letter about this mine, from the pen of John Deebie. I shall not attempt to say a word against this mine, like many others, for I think it will ultimately turn out a good mine if worked with economy. Mr. Deebie would have your readers believe he knows something of the mine and district. Let us see if it may be that it is five miles north of the mines he names—it is certainly not west. The engine-shaft is about 25 fms. deep, sinking at 24. per fathom, and the 30 fms. level will not be reached in a week, nor two. They are not sinking on No. 4 lode, and it is eight weeks since the last sale of tin, and the cross-cut to the rich stream lode is not decided upon yet. Is it not over 12 months since Mr. Deebie assisted in removing the materials? I have heard that they were purchased from a splendid rich mine, that was reported on by people from Roche—Leperrey. The mines in that part of Cornwall so often change names, it is hard to know the right. I quite agree with the *Western Daily Mercury* that there are a lot of paper mines still requiring weeding out. The wonder is that capitalists do not obtain better advice ere they throw away their money.

A MINE AGENT.

GRAIT TIN WORKS MINE.

MAISTUR EIDITTUR.—Sur, I heard them read a croom of sketch upon your paper a few days ago about this mine from "Old Tributur," and the wear I have brave about it, and read that must be Old Jack, for he worked there, and do know all about it, and I suppose it was, for that was what he always say and manne of us, beside he do know it to be true anouf. I read the wear I have to hear what was put in the paper from "Old Tributur:" but, in justice to him, I oft to say also that the did not laf at the truth of what was said, for none end deny it—but, Mistur Eidittur, you will guess why the laffed. Why, Sur, he is from the same school as myself—broft up a poor old miner's boy, just schoolin anouf to tell on letters before hooked in to work, and we have to toll all our lives, and who oft to know tin and copper, and lodes and everthing about mining if we didden. The laffed at the worded and the spellen, and that was all the could laf at, for I know that "Old Tributur" is a fine sight better miner than the, and what he meant was well enouf, and if the water was pulled out ide bet heed soon prove what he said to be true. I have heard he have goat his eye upon a pitch that he said, and others to, that it will turn a ton of tin a month, and I reckon I do know wear that is, for I didden work far from it, and mine was and is a bra good pitch now, but I am not goen to tell all I do know yet; if say much more the capen will have their eyes open, when the water is forken, and give us a light tribute, and I do want to git a bit of a sturt if I can. There are plenty of places for tributurs and others beside "Old Tributur" and myself, and will say, as a bit of a guide to those who never worked there, the bottom is the best part of the mine, and, if prates and experience is counted anything now-a-day, I am fully persuaded that the bottom of the mine will still be best when 50 fms. or more deeper. As "Old Tributur" said, it is only now gotten down on the tin, and quite time anouf to look for it for make a good and lasten mine. This is the best tin sett I do know in a day's march, and the company can begin to send up tin in twenty-four hours after the engin begin to pump out the water. You will, Mistur Eidittur, I have no doubt excuse air blunders, for my jammer is dead, as well as "Old Tributurs" but I suppose the people will be laffen at this to. I don't care for that—with all their schoolen, grammer, and sience, I

think yet that "Old Tributer" and myself if we could get them down underground to elevate the tools, and chat over the properties that make up a good gold ore or mine we could noddle them into the shafts; and I must say, Master Editor, by way of conclusion, that if the Great Tin Works Mine is properly worked she will be but a very short time before in your Dividend List, for I consider it was the point of it when stopped about seventeen years ago.

April 29.

FLAGSTAFF MINING COMPANY.

SIR.—If you do not think it unduly trespassing on your valuable space, I should like to give my fellow-shareholders and the public the result of enquiries I have made as to the present position and future prospects of the Flagstaff Mining Company, in order to refute the false reports spread through the Stock Exchange by "bears" of the shares, and to maintain the confidence in the undertaking of those who through timidity might otherwise hasten to dispose of their shares at the present low market price: it is rumoured that the company cannot continue paying a dividend beyond a month or two, whereas there is every reasonable probability of the dividend being increased in that time, or a large bonus paid in addition to the present rate of dividend. Let me deal with facts, and not anticipate. It is well known that the roads in the neighbourhood of the mine are impassable during the winter months on account of the snow, and the furnaces have to discontinue working for a time. This company has been fortunate enough to continue the transport of sufficient ore down to the furnaces to keep on working out of three going, and this has turned out to be a handsome dividend (30 per cent.) we are now receiving. One is being stored at the mine ready, and as soon as the roads are free from snow (it is now fast disappearing) the other two furnaces will be kept supplied. If one furnace can pay at the rate of 30 per cent., what will three pay? The prospects at the mine itself are stated to be better than ever. We have had the experience of upwards of a year, and we find that the company have been able to increase the dividend from the rate of 24 to 30 per cent., and to keep this rate up during the winter. Have the "bears" read the figures in the profit and loss account? Up to the end of November, 1872, £1,600 was paid in dividends, since that date, £1,000—making a total of £2,600 out of the mine, which cost only £300,000, and all the heavy working expenses and preliminary charges have been paid in addition.

In the face of these facts, how is it that the "bears" are able to run down the market price of the shares? Only by spreading false reports. I have not the pleasure of the acquaintance of the directors or of anybody connected with the company, but simply give the result of my enquiries in order in some measure to counteract these false reports.

CONFIDENCE.

EMMA AND HOME MINING.

SIR.—Emma shares under £1. No wonder the collapse of this gigantic adventure is causing irritation. When will English capitalists realise the fact that English mining presents a fair and honest field for earning a large dividend on investments? This loss upon the Emma represents £50,000. I do not hesitate to say that if the million sterling thus thrown to the Americans at the bidding of Prof. Silliman had been expended in our own mining districts we should not read such discouraging reports of the state of British mining enterprise as your weekly columns exhibit; and the many promising mines of Cornwall would not be collapsing for want of capital amidst this plethora of wealth now seeking employment, and often in vain, in London.

A CONSTANT READER.

[For remainder of Original Correspondence see to-day's Journal.]

MINING COMPANIES.

"The grand results of Mining are its best advocates."—HUME.

Were the rise and fall of the prices of mining stock, which usually finds a quotation on the mining market or on the Stock Exchange lists, to be taken as a criterion of the interest which the public takes in mining enterprise, I should look upon this industry as being indeed in a bad way; but, so far from this being the case, I firmly believe that there is now a larger amount of capital at the present moment invested in the prosecution of mines in this country than has ever been known before; and if coal and iron have swallowed up somewhat more than their share, the metal mines have no reason to complain. The majority of the best mines are unknown, even by name, on either the Mining Market or the Stock Exchange, and there are plenty of first-rate ventures well supported going on of which the members of stock exchanges know little or nothing. When an investor is attracted by a quoted mine it is generally when, through a series of peculiar combinations, and by the continual publication of a large number of laudatory letters and reports, the shares have reached a very high premium. Then is the time, when the excitement is on, that, having begun to play with the bait, he swallows it whole, and with what result? Why, with scarcely an exception, he loses a very large portion of his money. A market mine on a discovery is invariably rigged far beyond its value, and a careful study of the mining papers for the last 20 years will show how seriously the public have lost by this infatuation. Men put thousands into undertakings of this kind who would not risk hundreds in smaller ventures, carried on solely upon their merits, and then, when they lose their money, abuse mining as the cause of it, rather than acknowledge their own folly. Some few exceptions there are, and on the Stock Exchange list will be found the names of several sterling and lasting properties. They are the levers which lift up the rest, but, except where a sudden demand causes an inflation of price, shares in these mines are difficult to obtain, because those of the general public who have been in them from the beginning see no advantage in selling out, and such of the shares as were at first in the market have become gradually absorbed.

When my father brought out Great Laxey in London, it was with the greatest difficulty he could get people to look at the shares, although the courses of gold could be measured with a 2 ft. rule, and there were years of reserves ahead, but at that time there was no difficulty in selling East Canadian shares (a market mine) at over 500. One of the largest dealers on the market did Great Laxey the honour of saying that its shares were not worth the paper they were written on; yet, upon its own merits, Great Laxey shares were steadily absorbed. The treasurer and secretary of the mine in the Island did not believe in it, and sold his shares at the lowest price. The manager, Capt. Rowe, did the same; many of the old shareholders followed suit; but the glorious old mine responded to every call that was made upon it, and supported everything that was said of it in London. It became so popular that it may be said to have forced its way into the Stock Exchange, and during the panic of 1866 was, I believe, the only security that, instead of suffering a decline in those disastrous days, positively experienced a rise in price. From that time forth Great Laxey became the most popular mine of the day, and whatever alterations have taken place in the price of the shares have arisen from the mere effect of supply and demand. They never have been rigged, and I hope they never will.

It will be noticed how steadily Van shares now maintain their price, showing that the great majority of holders are content with their security, and see no advantage in making a change; and they are right; but, unfortunately, many shareholders went in at over 500, or nearly 20 times the nominal amount of the shares. Possibly, however, some day we may see such returns as will even justify this large price. The great lesson to be learnt is not to purchase when high quotations are rife, and the name of a mine is in everybody's mouth. The reaction is sure, and it must be remembered that when prices are falling buyers are scarce. Setting on one side, however, those mines with whose shares the brokers and a certain portion of the speculative public are playing at battles and snuffboxes, we have a large number of progressive mines which are being steadily and earnestly pushed on to test their several merits, and to whose success the adventurers alone look for profit. It may be that the high price of metals has caused the taking up and working of many old mines which will come to grief in hard times; but to make up for this there is a sufficiency of good ventures which, although they may require time, will, I believe, show a large per centage of successes at a comparatively small cost.

The news from Australia is again very satisfactory. The increased shipment of gold, and the large amount of dividend last year paid on mining stock, tell their own tale. From Thornhill Reef our letters are dated Feb. 27. The report from the manager may be considered as highly gratifying. We are steadily, but surely, reaching the goal for which we started.

The advices from Colombia, although not exciting, show a steady progress. If nothing intervened Roca would have commenced washing ere this, but we must allow a month or two to get rid of the waste ground before we reach the gravel deposit, to bring down which our great efforts are directed. The return from Malpaso shows an improvement, but it must be remembered that we are still working in the waste, and have not reached the main gravel bank, which is yet ahead of our sluice, still the new ground we are taking up is improving, and the Spanish appear to have considered it worthless. Malabar there can be little doubt is a very valuable property, and which from its great extent will eventually make five or six large mines, the sale of some of which to independent companies cannot fail to form a source of large profit to the holders of Malabar shares.

Glan-Seyven shares are being quietly absorbed. I was at the mine last week, and noticed a steady and continuous improvement in the adits which are being driven on the Cwmystwyth and Pantmawr lodes.

I was also at Cies Hill, and made a careful examination of the company's property and works. I noticed very considerable and decided improvements in the new works last, whilst many other changes were gradually being brought about, and new works carried out. We are now raising from 100 to 120 tons of coal per day, and I believe that quantity could at once be greatly exceeded, but unfortunately we cannot get our new trucks sent in as quickly as we could wish, and have, therefore, great difficulty in sending our coal away fast enough. It may not be generally known that the railway companies, decline, for obvious reasons, to let their trucks to colliers; consequently, each colliery has to depend on its own rolling stock, or such as its customers may have.—*Tramway's Investment Circular.*

CHEAP TELEGRAPHY.—Some months ago I read a paper to the Society of Arts on the possibility of telegraphing for great distances without insulation, for which they were good enough to vote me a medal. I now find, however, that by the discovery of a new insulating material perfect insulation can be provided at a ridiculously small cost. I find by the addition of this material, which is simply tar chemically modified, nearly 200,000 per cent. is added to the insulating power of a thin coating of gutta-percha. I hope the result will shortly be found in the great cheapening of telegraphy.—*H. Hinton: Putney.*

SULPHUREOUS ORES.—Mr. K. WALTER, of Augsburg, has patented some improvements in furnaces for burning sulphurous ores. The grate of the furnace on which the iron or copper pyrites (reduced to a suitable size) is laid is formed of bars which are capable of rocking in their bearings. These bars are made of such a section that when in their normal position the spaces between them will be sufficiently narrow to ensure the retention of the ore in the grate, but when rocked will open spaces for the discharge of the ore that lies next the bars.

HOLLOWAY'S PILLS AND OINTMENT.—Multitudes have congratulated themselves on their immunity from damaged stomachs, sick head-aches, and insupportable flatulencies, since they have occasionally resorted to these fine alterative medicines. Our comfort, happiness, and security, depend on the knowledge that most diseases originate from a trifling beginning, and that the large proportion of the evils from indigestion to the state of dyspepsia, which Holloway has turned this knowledge to good account by discovering medicines which cure without exception the attendants on disordered digestion. They ward off likewise the torturing sick head-ache. The ointment will be well rubbed in twice daily over the stomach, liver, and bowels, to them it penetrates, and aided by the pills immediately works such a revolution as establishes perfect digestion.

IRON AND STEEL INSTITUTE.

Continued from last week's Journal.

Mr. JEREMIAH HEAD, of Middlesbrough, next read a paper on A NEW METHOD OF PREVENTING SHOCK IN REVERSING ROLLING MILLS, in which he remarked that two years since the attention of the Institute was first called to the serious evils attending the shock arising from the use of clutches in reversing rolling mills, by Mr. Benjamin Walker, of Leeds. In the course of his paper, Mr. Walker said that the only instance he knew of the actual application of a suggestion for removing sudden shock was a plan designed by Mr. Charles Bladen, and applied to some new mills then in course of erection at Jarro. His plan was to mount the claws of the clutch in such a manner that when the running claws came in contact with those at rest they would slightly give way, and thus reduce the shock, just as the buffers of a wagon give way on coming in contact with another wagon with similar buffers. While the contrivance lasted it answered the purpose thoroughly; but from its faulty construction it had to be removed. Mr. Walker proceeded to describe the systems of reversing adopted by Mr. J. Ramsbottom, of Leeds; Mr. F. Kilson, of Leeds; and his own firm, at Middlesbrough. At the Glasgow meeting of the Institute the inventions of Messrs. R. D. Napier and G. Stevenson were thoroughly discussed.

In introducing a new method, founded upon Mr. Bladen's original idea, Mr. Head disclaimed any intention of competing with the before-named inventors, the merits of whose various methods he cordially acknowledged. He invited attention to his merely as an alternative scheme, applicable in cases where the other expedients would be inadmissible, and especially where it was desirable to improve existing old-fashioned reversing gears with minimum loss of time and expense. Mr. Head's method consisted of the introduction of a loose face between each loose wheel and the clutch. These loose faces are bored out to the same diameter, and are carried on the same portion of the loose axle as the spur wheels, with which they are in contact. Cast in them are recesses, corresponding to, and engaging with, the claws of the sliding clutch, instead of these claws being made to engage, as heretofore, with recesses or claws upon the inner faces of the loose spur-wheels themselves. Each loose face is made in two halves, firmly bolted together, so that one or both halves may be readily removed and replaced when necessary. Cast in the back of each half of the loose face is a recess or pocket, into which is firmly secured an arm or lever, composed of bars of spring steel. The extremity of each spring arm is held in a socket attached to the inside face of the loose spur-wheel in contact with it. In the act of reversing the clutch is thrown to one or to the other side in order to communicate to the shaft upon which it slides the motion of the loose spur-wheels with which it engages, and which, by means of the wheel work behind them, are permanently rotating at a constant speed, in opposite directions. Precisely the same takes place under the improved system, except that the loose shaft acquires motion, not direct from claws solid with the rotating spur-wheel, but only as the force in the iron thereof can be transmitted to it through the two spring arms attached to the loose face. These spring arms yield, to a certain extent, just as does the spring drag hook of a locomotive when it suddenly endeavours to start a heavy train. Should the spring arms have failed to impart their motion to the sliding clutch and loose axle, after having yielded as much as they are capable of (about 1-40th of a revolution), then certain projections upon the loose face would come in contact with safety claws secured to the arms of the loose wheels.

This device all danger which might arise from breakage of the spring arms, or from their being drawn out at their extremities. The maximum force which the author had ever found requisite for rolling a single plate was 17 tons in the engine piston, moving at the rate of 272 ft. per minute, equal to 7½ tons exerted at the extremities of the two spring arms, or 3½ tons upon each. The spring arms, composed each of 41 plates, 3½ in. by 5-16ths, are sufficiently strong to bear this load safely. This and Mr. Napier's method of reversing, are the only modern ones admitting of being operated by an ordinary lever worked by manual power—that is, without the intervention of steam or hydraulic apparatus. The cost of two loose faces, each with a pair of spring arms, and all the necessary brackets, safety claws, bolts, and wrought-iron work necessary for application to an ordinary reversing gear, is about £200. If the loose faces were of cast steel or wrought iron they would cost more in proportion. The author concluded by saying he had not patented his invention, and would freely and willingly give any further information which any member might desire. The paper was illustrated by two diagrams, and a highly finished working model.

Mr. WALKER thought the plan an improvement on anything that had been done. He might take a clutch and it would work for years with a small fly-wheel; but if a large wheel were used the case was different. He believed that Mr. Head would find the same difficulty when he used a large fly-wheel. He considered that in a perfect clutch you must have the means of removing the clutch at any moment even while the iron was in contact. Most of the contrivances, too, required more space than could be allowed to them. He thought that since he read his paper he had succeeded in devising a clutch which would meet the objections he had mentioned. The Ramsbottom clutch has, no doubt, the advantage of being thrown in or out very rapidly, but it used too much steam. He believed that at Nelson's mill, at Motherwell, they used a clutch as nearly perfect as possible, considering it was a common clutch.

Mr. J. A. JONES, of Middlesbrough, was astonished that in place of looking for a total change they should continue to attempt improvements in the old form of reversing rolls. In the United States three high rolls had been successfully used, and could be seen in 13 or 14 places, and in Belgium the system had also been adopted. He thought that if the Institute proposed to visit the United States next year they would save much discussion.—Mr. RICHARDSON agreed with Mr. JONES's views.

Mr. SAMUELSON was at Creusot recently, and saw three high rolls working very well, and turning out excellent plates.

Mr. E. WILLIAMS enquired what they would do with heavy ingots, which they had to roll into girders or deck beams with three high rolls. The difficulties of turning and handling them to bring them at all three stages would be insuperable.

Mr. JONES explained that he did not see any serious difficulty in the matter.

Mr. E. WILLIAMS was astonished that an old roller could talk such nonsense. Three high rolls would, perhaps, do well enough for plates, but for many forms required they would be quite valueless.

Mr. JONES might mention that in the United States he had seen a separate piece of machinery specially designed to do part of the work which Mr. Williams had described as impracticable.

Mr. JONES had referred principally to finishing rolls, but if Mr. Williams referred to roughing rolls only, he believed that much could be done.

Mr. WILLIAMS still held that it is practically impossible to reduce a pile—say, 12 in. square—to an ordinary girder in three high rolls.

The PRESIDENT said that the subject appeared to have brought to light the advantage of the Iron and Steel Institute in facilitating the exchange of views upon practical matters, the such doubt he thought, that each member had some merit, and they had had a novel idea started at this meeting—that it was a mistake altogether to roll iron as they had been accustomed to roll it; but as some of them would, perhaps, continue to use reversing rolls, he thought that Mr. Head had described what appeared to him to be an ingenious invention.

Mr. HEAD said he had two sets of this gear in operation, and found them work well. He did not understand the difficulty referred to by Mr. Walker arising from the size of the fly-wheel. As to the difference between a small and a large fly-wheel it was really nothing, because in the case of all fly wheels of the sizes now in use there would be nothing to stop. In all cases, however, the question of the three high rolls and reversing rolls, as it did not enter into the subject of the paper.

MULLER'S ROPE RAILWAY.

Mr. H. M. MORRISON read a paper descriptive of a cheap, efficient, and rapidly-constructed system of railway, especially suitable for carrying ironstone, coal, stone, timber, and all kinds of material in districts where ordinary railways would be difficult of construction, costly, and slow in their formation. The late enormous demand for minerals for iron making has caused active search to be made in districts hitherto unexplored, and in many cases valuable discoveries have been rendered nugatory by the heavy cost incurred in carting the material to the nearest railway station. Mr. Muller, of Vienna, Austria, has discovered a system of this kind, and I trust the adoption of this potent will be the means of developing these and many other districts. The use of a rope for transporting loads extends back over a large period of time, and has been used to some considerable extent, but in a very primitive manner, in Holland, India, and Italy. At the present time there are three systems in use, all of which have been practically applied, and each differing from the other in the form of construction. The first and most primitive of these systems consists of two parallel and tightly-stretched ropes, securely anchored at each end, and each rope serving as a line of railway; on these ropes run roller frames, or monkey carriages, the tubs being fastened to and suspended from them. To these carriages are fastened a light rope, running under a pulley at the highest end of the line, the loaded car descending by its own gravity on one rope, and pulling up the empty car on the other; this system is used to some extent in France, and in some cases the ropes are stretched across a clear space, without supports, of 400 and 500 ft. In the year 1870 Mr. Hackney employed this system very effectively in removing the soil from the excavation at the extension of the Landore Siemens Steel Works. In this case the span was 155 ft., the speed run is about eight miles per hour, and the number of wagons sent across daily being about 30, each carrying from 10 to 12 cwt. of soil. The second system is known as Hodgson's, and consists of an endless rope, running on rollers, and supported at intervals by iron or wood posts. The rope is driven by a motor fixed at one end of the line, the requisite friction for moving the rope being obtained by the use of Fowler's clip-pulley. At intervals, suspended from the rope, are specially constructed boxes, so arranged as to maintain the centre of gravity immediately under the running rope; the full boxes pass along on one side of the line, the empty ones returning on the other. The third system is Muller's rope railway, which is the subject of this paper. It has been invented by Mr. Muller, the director of Sigl's extensive engineering works at Vienna. Rope railways, constructed on the principle of the two first systems mentioned, require as a special condition that the material to be transported shall be carried in boxes or tubs made suitable either for travelling on or being fixed to the ropes; this forms an expensive feature in the arrangement, looking at the time occupied in loading and unloading, the risk of breakage (especially in coal), the extra cost thus incurred, as well as the cost of the additional carrying plant so required. In Muller's system this is obviated, as the tubs or trams in use at the coal or ironstone mines can be so arranged as to pass direct from the mine on to the ropes, and so pass to their destination without any delay or extra cost in unloading. The system is also admirably adapted to act as a feeder, or as a means of communication between narrow-gauge railways, whose termini are intercepted by precipitous valleys, water, &c. The simplicity, cheapness, as well as the capability of rapid construction of this tramway render it especially suitable for mountain purposes, because expensive bridges, tunnels, and heavy earthworks are rendered superfluous, as the tracts, being able to overcome an ascent of one in six, can pass over the mountains in a direct line. Inundated land and broad lakes can also be passed over, and when the depth of the latter prevents the fixing of supports in the bottom they could be fastened to anchored flats, with spans between each flat of at least 400 ft. This rope tramway can be used advantageously for forwarding material at outlying distances from the railway communication, to transport the raw and finished materials to and from the works, as suitable cars of any description could be arranged to travel on the rope. No system is better adapted than this for carrying beet-root, sugar, coffee, rice, or any other kind of plantation produce. Upon the upper ropes of this tramway trees of any length can be carried by

placing them upon notched cross-beams, which drop down upon the ramps after having passed over the end pulleys, and the timber remains in a secure position, the suitable carriages can be arranged to revolve them, the carrying cross-beams may be returned on the bottom line of ropes. Light cord lines constructed on this system may be applied to carrying letters and parcels at a speed averaging 10 miles per hour. The tramway may also be used as a passenger line, and its safety has already been proved in actual practice. In 1866, shortly after the completion of the patent, Mr. Sigl erected a short line at Vienna, running from his works to the village of Wöhring; this tramway was carried over the fortifications, houses, &c., and was used for the transporting of heavy castings, bulks of timber, and general plant required in the erection of a large mill. It was used daily by the workers as a passenger line, and without the slightest accident. The number of workers over it was about 60 per hour, each carrying 8 to 14 cwt. It was critically examined by the leading engineers of Vienna, and pronounced a great success. A short line, 1½ miles at the falls, and has a span of about 400 ft. It is used for carrying the workers connected with the rope transmission of the Wasserkraft-Gesellschaft. Mr. Scott and myself crossed the river in the air a few weeks ago, and our own testimony to its general efficiency. We are at the present time making arrangements to bring this tramway into use as part of the material of an invading army for the purpose of carrying provisions and army material to and from the front of the nearest railway or water communication. The various uses to which this tramway can be applied are so numerous that I should be trespassing too much on your space to mention them all in this paper. I will, however, proceed to explain the mode of construction, which will be printed and accompany this descriptive paper. In all cases the cars are carried on two parallel endless ropes, passing at certain points over smaller pulleys. The distance and application of these pulleys depend upon the nature of the ground, as well as the weight to be carried, and in many cases the expense of the wood or iron carrying posts can be avoided by taking advantage of trees or rocks which may lie in the line of route. The motor, which may be a steam engine or water-wheel, only acts at one end. The large pulleys at the driving end are both keyed on to one shaft, and are set in motion by the motor. It is scarcely necessary to mention that all carriages, tubs, or vehicles of any kind can be carried on the ropes. The ropes themselves transfer the motion to the smaller pulleys. Any kind to be transported, consisting either of vehicles, basket cars, and timber, is made to rest upon the ropes with four claws, or notches, in order to prevent oscillating of the object conveyed, and allowing it only to follow the movement of the ropes when passing over the rollers; and while two of the claws simultaneously act on the ropes, the two other claws keep the load upon the rollers by friction. The large driving and returning pulleys are lined with wood so as to increase the grip of the ropes and avoid the wear consequent upon the ropes being drawn on iron beds. The system of disengaging claws attached to the tubs and first used was complicated and expensive, and although retained as part of the patent have now been replaced. The vehicles are now fitted with claw bars, or the claws are so arranged as to fall level with the sides of the tubs when not resting on the ropes. There is an elevation and plan of wire tramway representing any length from 1 to 10 miles. Two large pulleys near to and driven by the motor are fixed on a neutral shaft, the two opposite being bedded on separate shafts, and having a tightening apparatus, and one of new and improved form has now been added to the patent. Wooden ramps are provided, which serve to bring the cars from the lower level to the upper ropes, and vice versa. The upper is called the track line, and the lower an inclined plane on which the rails are laid. The lower line is elevated at the end of the track when the vehicles arrive at the lower ropes. This line of rails is horizontal, beginning under and between the nearest grinding rollers, so that it may receive the vehicles running off from the ropes and carry them over the top and always clear of the large pulleys to the travelling platform. Natural inclines will always decide whether sliding or climbing is the most suitable, or whether it is most suitable for connecting the line of rails. At the other end, the track is similarly arranged, and has a slight fall towards the first carrying pulleys, so that the cars pushed off the sliding platform run on to the ropes of their own account. The coupled trajectories are both worked by one motor, and can be understood without further explanation. An arrangement of this kind is not suitable for long lines, because by dividing it into sections the weight of and strain on the ropes are very considerably diminished. It also enables the line to be arranged around a very sharp curve, as the shafts of the driving pulleys may be so bedded that the rope way at this point forms an obtuse angle with the rest of the line, without stopping, or without manual help of any kind, this being effected on the upper line of ropes by the momentum of the running vehicle, and on the lower line by giving the junction rails the necessary inclination. As large cars, weighing over 5 cwt. when unloaded, are difficult to push up the ramps, the inventor has designed an arrangement which obviates the necessity of the inclined planes: he lets the loaded and unloaded cars run along a horizontal track of rails at the end of the track. In this case the shafts of the driving pulleys are placed nearly horizontal under the scaffolding, which supports the rails and the first guiding pulleys. It is so arranged that both the ropes run parallel, and next to each other in a direction, and those coming from the return end of the trajectory are placed on the same level at the side of each other, and not above each other, as in the constructions previously described. It is not necessary that these terminal stations shall be on the same plane; but, according to the requirements of the position, any inclination may be given to the ropes up to one in six, which may be worked with perfect ease. As most engineers and manufacturers taking an interest in this invention will be desirous of ascertaining the cost per mile, it is necessary to give an estimate to have a proper section of the ground to be traversed, and the quantity to be carried, height of the various scaffolding required, and the nature of the same, as the ironwork and erection of these latter, if used frequently, will be an important feature in the cost of erection. The difference between the use of steel wire-ropes and iron wire-ropes tends also to a material difference in first cost, but taking fair average conditions of erecting one English mile, inclusive of a class 12-horse power portable engine; but, exclusive of the erection of the ramps, about £1000, may be taken as fair average, according to present prices of material and labour. The wire ropes are four or six inch in diameter, and must be of the best material and workmanship, and most carefully laid. Steel wire-rope is strongly recommended as being better adapted to withstand wear and tear, consequent upon the necessary friction. As a general rule, the supporting posts may be placed 300 ft. apart, and with steel ropes 7½ in. in diameter a span of 10 cwt. may be carried between each support, exclusive of the empty vehicle the top ropes, and allowing 30 seconds for clearing each space, the tramway would forward 50 tons per hour, or by increasing the size of the ropes, and power of the engine, a total quantity of 100 tons per hour can be obtained. The driving pulleys average from 8 to 10 ft. diameter, and are lined with willow wood. The guiding rollers average from 18 to 30 in. diameter. The upright posts for supports average from 8 to 10 in. square; ordinary Swedish or mangel timber may be used.

OXIDE DRY BOTTOMS FOR MILL FURNACES.

The proceedings were continued on Friday by the reading of an interesting paper, by Mr. THOMAS GREENER, of Darlington, "On Greener and Ellis's Patent Oxide Dry Bottoms for Mill Furnaces," in which it was stated that the puddler could never have the power to enable him to make good iron with an efficient or unsuitable lining or setting for his furnace. He then described the Catalan, or Corsican forge, which still survives in the Pyrenees, and a few other isolated localities in the South of Europe, from which wrought-iron is made direct from the ore by one furnace. From this he remarked that the unity and harmony of working had been disturbed by the multiplication of furnaces in modern times. Mr. Greener reviewed all the kinds of setting now used for the sides of the puddling-furnace, such as limestone, blue billy, bull dog, Swedish magnetic iron ore, hematite ore, pottery mine, and he asserted the only approach to a suitable setting is the artificial oxide obtained as a cinder from the ball furnace, the cinder being the residue of the operation of the mill furnace, and is used for making this cinder for setting. He contended that the cinder derived from the oxide dry bottom is superior to any he had named. It was capable of not only setting the sides of the furnace, but also of supplying all that is necessary to keep up the lining for the bottom of the furnace, and thus dispensing with the scrap ball. He then drew attention to the mill-furnaces as they now exist. The history of these furnaces is the history of the material composing the bottom of the furnace. He showed that neither the sand bottom or the liquid cinder bottom can co-operate with the puddling-furnace on the one hand, and with the rolling-mills on the other. He contended that there was an absence of harmony in the present arrangement. He minutely described the operation of the sand bottom, showing the loss of cinder that is absorbed by the sand, but that from it the iron can be "rolled off." The liquid cinder bottom was then examined, and shown to be a great waste of iron, by its abstracting from the pile that is being heated. The number and variety of the mill-furnaces was stated to be undesirable. One kind of furnace only is needed, and an artificial oxide bottom, and the large reverberatory furnace, the puddling-furnace, are not satisfactory. Mr. Greener then described the new process, showing how the oxide dry bottom is made—the alteration costing only from 20s. to 30s. per furnace, and when no furnaces are to be built no extra expense is needed. He said it was important to observe that, although it is an oxide bottom, the piles of iron are in all cases charged on a dry bottom, the same as on sand. They are heated on a dry oxide bottom and drawn from an oxide dry bottom, being a great contrast to a liquid cinder bottom. After comparing this dry oxide bottom with sand and cinder, he showed that by using the dry oxide there is much less waste in the puddling, labour is reduced, and there is less cost for material in the use of scrap ball, foreign materials for setting, sand, &c. The quality made is superior, showing a fine surface, a purer fibre, more ductile, working softer in the rolls. The better yield in the puddling and rolling furnaces, items greatly in favour of the oxide dry bottom. The mischief done to that part of the iron pile resting in the liquid of the cinder bottom was especially referred to. Without speaking of the value of improved quality, Mr. Greener asserted that in the present market price of pig and of finished iron the adoption of the oxide dry bottom would enable the manufacturer of 20s. per ton. The new process, in real work, bringing out such favourable results, enabled the author to state with confidence that the sand and cinder bottoms may both be dispensed with, and that the furnace making puddling will be needless—the oxide dry bottom, the puddling-furnace, every purpose, and producing, in all respects, superior results. That one mill-furnace, with this bottom, will produce as much puddling as will supply six puddling-furnaces; and that the six puddling-furnaces will, in their turn, supply as much puddled bar as will keep the mill furnace going.

Mr. GREENER could not understand that any such deterioration as Mr. Greener had referred to could be produced by the sand bottom, consequently could not see any great improvement in the use of a dry oxide bottom.

Mr. JONES agreed with Mr. Greener; he never used sand bottoms himself, and found great advantage at Middlesbrough to result from iron that could not be rolled off from a cinder bottom. But, which was better, could not be rolled off. He thought it would be found that in rolling mills there would be a serious difficulty in the way of the bottom described by Mr. Greener.

Mr. JONES would say unhesitatingly that a cinder bottom could be kept as dry as a sand bottom if there was a good slope to the furnace.

The PRESIDENT, in moving the vote of thanks, expressed the hope that for their

There are no signs of exhaustion of mineral. New mines are being opened about Wakefield, Leeds, and Castleford, to the number of four or five, each capable of producing 200,000 tons annually, and of supplying coal from the best seams, such as the household coal which is sent to London. Perhaps 14 or 15 new collieries are being opened in the district. In addition to the economies previously mentioned, the high price of coal causes slack and small coal to be used instead of being left underground. At his own colliery this only made a difference of 1-30th, but at others it was greater. They were now able to work at a profit a seam which was useless before, and the Lowmoor Company was working a 10-inch seam. So was his own company, the seams in the district ranging from that thickness up to 4 ft. 6 in. A curious result of this state of things is that the witness's company paid less rent last year than the year before. The royalty is paid per acre, and the land which contained the previously worthless seam was let to them at a very low rate. They took ad-

vantage of this to get the coal from the bad seam, where the royalty was low. In answer to Mr. Elliot, he said that rents had gone up. A minimum rent was always reserved. The royalty paid per acre was computed to amount to from 4d. to 1s. per ton, reckoning 1200 tons to the foot. The royalty for canal coal is higher. Mr. Hussey Vivian remarked that 1600 tons to the foot was the proportion theoretically. The same honourable member asked some questions about way-leaves. The compensation for the use of land to convey coals above or below it is from 10s. to 30s. per acre of coal worked. This apparently onerous charge comes out of the pocket of the owner, because it is calculated beforehand, and it has its share in raising the price of coal. The mines are worked partly on the "long wall" and partly on the "pillar and stall" system. The "dead" work has not been neglected in any instance of which he knew, but on the contrary considerable outlay had been incurred in respect of it. To Mr. Liddell he said that if it were neglected, the Inspector's duty would be to call attention to the subject, and he as a coalowner should feel bound to remedy the defect at once. He had no experience of coal-cutting machines. There were, however, 15 or 20 in the district, and their use was extending.

COAL MINING IN IRELAND.

A property which has been professionally inspected for the proprietors and favourably reported upon by Mr. EDWARD HULL, M.A., F.R.S., F.G.S., the Director of the Government Geological Survey of Ireland, is about to be worked by a company under joint English and Irish management—THE TYRONE COAL MINING COMPANY—with a capital of 100,000l., in shares of 50l. each, and as it is estimated that there are 3,600,000 tons of available coal without taking into consideration what may be obtained from the lower seam, which lies about 10 yards lower than that already worked, satisfactory commercial results are anticipated. It is remarked that the rude mode of working with shallow pits and inferior appliances on the out-crop of the coal has hitherto been the system of mining in this locality, consequently the coal raised has generally been of such inferior quality that it is only used locally by mill-owners, lime-burners, &c. A deep sinking for a superior coal has not been attempted, except in one instance, at a part of the company's property called Drumglass, and the result proved the opinions of all engineers who had examined the field to be correct—that coal in abundance, and of good quality, would be found if the seams here were wrought in the same manner as they would be in England and Scotland. The consumption of coal in the North of Ireland is steadily on the increase, owing to the extension of manufactures, and the use of coal instead of peat for household purposes. The estimated consumption for manufacturing and household purposes in the principal adjoining towns and district is at present above 4000 tons per week. A large quantity will also be required for burning fire-clay, of which immense deposits of the best quality are found in the district. The recent discoveries of large deposits of hematite iron ore in the counties of Antrim and Tyrone are likely to have a very favourable effect upon the manufacturing industry of the North of Ireland, as iron furnaces and the manufacture of iron must follow in their train. Thus a new and increased local demand for coal will be created, as the iron district is situated so near to this coal field that fuel for ironworks must necessarily be taken from the Tyrone mines.

That there will be a ready market for all coal raised is consequently beyond question, and as the Main, or Five-foot seam, under Drumglass portion only of the property is estimated to yield the quantity mentioned, the conclusion that for many years the company will be well able to maintain a regular supply appears quite justifiable. The Director of the Survey reports that the Drumglass seam has been worked in several collieries in the neighbourhood, and the seam has been found to have a thickness varying from 5 to 6 ft., including the clearing; in Drumglass pit the depth was 120 yards. The coal consists of two portions, separated by a bed of shale (or "clearing," which dips from 1 to 5 or 6 ft. in an easterly direction. The top coal, nearly 2 ft., is of good quality, gaseous, and comes out in large cubical blocks. The bottom coal is of a second-class quality—rather ashy; but with a proper system of working there ought to be no difficulty in keeping the two portions separate, so that the selling price might be regulated according to quality. The slack, or small coal, can be used for coking, which is a very important feature in an economic point of view. The coal is applicable for house and steam purposes, and as it contains, according to the analysis of Sir R. KANE, nearly 49 per cent. of volatile matter, it might be used for the production of gas. The lower seam has hitherto been worked to a small extent only, and is at present inaccessible, but when the machinery is on the ground and a good market exists there should be no difficulty in making all seams of 2 ft. in thickness readily available.

The principal reason that no trade exists appears to be that no efforts whatever have been made to create one, for Mr. HULL states that the demand for coal, both for household and manufacturing purposes, far exceeds the present supply from the Tyrone coal fields, so that nearly all the coal at present used is imported from England and Scotland, a fact which must strike anyone with astonishment who knows the large stores of excellent fuel which lie undisturbed beneath the soil. The supply is exceedingly limited, owing to the smallness of the coal mines, and the wretched system of mining at present in vogue in the Coalfield district. If two moderately-sized collieries were opened on these estates, each yielding from 100 to 150 tons a day, he has every reason to believe that every ton might be sold at the pit mouth. The chief local markets would be Dungannon to the south, and Coalisland and the large factories along the valley of the River to the North. He is informed that the present selling price at the pit's mouth is 23s. per ton for large, and 16s. for small, and considers that the cost of raising, including royalty and interest on capital, ought not to exceed 8s. for large and 5s. for small, so that a very large profit ought to be realised even with a lower price. It appears that hitherto the workings have been too near the surface to reach the superior coal, and the directors of the company feel assured that it is only necessary to adopt here the system of coal mining followed in other places, and an abundant yield will follow.

To anticipate great success with the mines carried on upon the system which seems to be generally adopted in the district would be unreasonable, but Mr. HULL has included in his report a series of careful recommendations as to future operations, which, if carried out, will doubtless give satisfactory results. He proposes that two collieries should be opened, not contemporaneously, but the second on the completion of the first. One pair of pits to be sunk on a spot to be selected on the west side of the Dungannon Road, and about 200 yards south of the boundary, between the townlands of Congo and Ballymenagh. The depth to the coal here may be estimated at 200 to 250 yards, and the pits would command a large tract of coal both to the rise and from the levels driven northward and southward. The main road could put these pits in communication with the Dungannon and other markets.

On the completion of these pits another pair might be commenced on the eastern part of the properties, so as to work the coal under the Kingarve and Mullaghtie Townlands. Each of these collieries are provided with a pair of shafts, and proper winding and pumping machinery of the best and newest construction would, perhaps, cost 10,000l., in all 20,000l., to which ought to be added cost of erection of workmen's cottages, &c. Mr. HULL very truly adds that the success of an undertaking of this kind will mainly depend on proper management and a good system of mining. This, therefore, will require to be very different from the system adopted in the Coalfield Collieries, which are a century behind the age. Nevertheless, the extent of the operations formerly carried on at Drumglass Colliery shows that the miners in the district are capable of working a large colliery if properly directed. At the same time he would recommend Lancashire as the district from which skilled labour and management should be drawn.

The opinions expressed by Mr. HULL are fully confirmed by Mr. EDW. T. HARDMAN, one of his colleagues on the Geological Survey, and from a careful estimate there is no doubt that with coal at only 11s. 6d. per ton at the pit's mouth a profit of 5s. per ton might be looked for. The property has also been inspected and reported upon by

Mr. W. MOLYNEUX, F.G.S., of Burton-on-Trent, who gives elaborate details as to the position and prospects of the mines, and the best means of working them, observing that with regard to the commercial prospects of the proposed undertaking there can be no other opinion than that its success will depend entirely upon the character of the means employed in developing the mines, and the system under which its management is carried on. In the first place there is no concealing the fact that there exists in the country a certain and to a large extent strong prejudice against the use of Irish coal, but it is equally clear that this prejudice is, generally speaking, both inconsistent and unwarrantable, and may, he thinks, be traceable to the long-pursued and most objectionable mode of extracting the coal by shallow outcrop workings, and the questionable course adopted in supplying it to consumers, rather than to the nature or quality of the coal itself.

It is, however, at the same time true that, to supply a local demand, coal seams of inferior quality, but still useful for steam purposes, have been and are still being worked in both districts, and, consequently, it is generally but erroneously assumed that these represent both the quality and condition of the only coals which the district affords. Judging, however, from his own observation, he is perfectly satisfied that the coal known as the Drumglass coal, enormous quantities of which lie as yet untouched, if not in every respect equal to the best of the Welsh or other coals imported into the country, is nevertheless superior to a large proportion which crosses the Channel, and is, moreover, in every way adapted to take, to a very large extent, the place and position, either for household, gas, or steam purposes, of any of the imported coals upon which the country has so long and expensively depended.

SCARCITY OF COAL.

The Select Committee of the House of Commons to enquire into the scarcity and dearth of coal examined in its sittings during the past week three new witnesses—Mr. Lindsay Wood, mining engineer and owner of six collieries, near Fence Houses, in the county of Durham; Mr. Jno. Thos. Woodhouse, of Derby, who had been a colliery viewer for 40 years, and Mr. W. P. Eard, miners' agent, Wigan. Mr. Wood is the first witness who gave any practical evidence as to the scarcity of coal. He said: "We find very little difference at present between machine and hand labour in the amount produced. A machine requires one man and a boy to generate power. The number employed in getting away the coal is the same as in manual labour. Each machine will cut about 24 tons per day in a small seam about 3 ft. thick. By the work of the machine 10 in. of the coal which would have been converted into slack by the work of men is saved. The advantage, therefore, is that you can get more coal out of the same proportion of mine. Coal-cutting machines will render seams available which were previously unavailable on account of their steepness, and will do so much for saving of labour or cost as for getting seams which would not otherwise have been so valuable. They produce more round coal, but do not diminish the number of men required. We cannot work them in certain states of the roof. It takes a man a longer time to learn the machine than to become a good heaver? Well, it requires a different kind of skill. We work our machines entirely by compressed air. We find that it relieves the men in the more oppressive labour of getting the hard coal. We use the machine not so much for economy in saving men's wages as the improvement in the value of the coal got. It improves the merchantable value. There has been no difficulty raised on the part of the men in all the many years we have been endeavouring to introduce the system. I think they rather prefer it than otherwise, because it takes off the hard part of the labour. The machines he had used for ten years were Frith's patent, but he was trying a larger one, by Messrs. Baird, of Gatherrich, which shows, so far as it has been tested, a considerable saving in the labour of bolting. The Committee adjourned until Monday next.

IMPORTANT CASES UNDER THE COAL MINES

REGULATION ACT, 1872.

At the Warwick Petty Sessions, held at Coventry, on May 2, George Clarke, contractor of the Speedwell Pit, Hawkesbury Colliery, Bedworth, was summoned, by direction of the Secretary of State, for employing a boy, named Thomas Bull, on March 1 last, contrary to the above Act. Mr. Dewes, of Coventry, solicitor, appeared in support of the summons, and Mr. Bristowe, Q.C., M.P. for Newark-on-Trent, appeared for the defendant. Mr. Dewes said that the prosecution was instituted at the instance of the Government Inspector (Mr. Thomas Evans), and was ordered by the Secretary of State that the offence was under sect. 5, which enacts that "a boy at the age of 10 and under the age of 12 years shall not be employed in or allowed to be for the purpose of employment in any mine to which this Act applies below ground, except in a mine in which the Secretary of State, by reason of the thinness of the seams of such mine, considers such employment necessary, and by order published, as he may think fit for the time being allow the same." The Government Inspector was present, and would prove that no such order of the Secretary of State had been made. Mr. Dewes called the attention of the Court to sect. 61 of the same Act, which substitutes imprisonment for a pecuniary penalty, and observed that to impose a fine of 40s. upon a person in the position of the defendant would not be a punishment, but a mere joke. Mr. Dewes said that not only would he be able to prove that the boy was under 12, but that three weeks before the accident occurred by which he lost his life a certificate was taken to Mr. Tansley, the agent of the colliery, by the defendant Clarke, who was afterwards directed to discharge the boy. The defendant promised to do so, but the boy was kept for three weeks, and up to March 1, when he was killed. Under such circumstances, Mr. Dewes strongly contended that the clause imposing imprisonment was applicable to the case. Evidence was given to show that the mine was not certified by the Secretary of State for employment of boys under 12, and a certificate of birth was produced which showed that the deceased was born on March 7, 1861. Arthur Tansley, acting agent at the colliery, proved that about three weeks before the boy was killed the defendant handed him a certificate as follows:—"Bedworth, Jan. 29, 1873. I hereby certify that Thomas Bull is 12 years of age. Born Dec. 20, 1861. Signed yours truly, Eliza Bristowe, the Government Inspector of the district, and the Secretary of State." Mr. Tansley was 12, and by figures that he was called the attention of Mr. Cunliffe, the manager, to the circumstance, and afterwards directed defendant to discharge the boy. Mr. Cunliffe, the manager, also proved that the boy was killed on March 1, and that Tansley had handed to him the certificate above mentioned, and admitted that he saw defendant about three weeks before the accident, and mentioned to him the discrepancies in the certificate.

Mr. Bristowe, for the defence, contended that there were no justifiable grounds for the prosecution under sect. 61, which substituted imprisonment for a pecuniary penalty, and if there were any justifiable grounds for the prosecution they fell under the direction of the Secretary of State, and the penalty only. He also contended that the discrepancies in the certificate came to nothing, and that defendant was justified in not discharging the boy if he had reason to believe him 12 years of age, as represented, and referred to sect. 15 of the same Act, which exempts the manager or other person acting in good faith upon such representation from all blame, which is by such section thrown upon the person making the misrepresentation. The magistrates retired for deliberation, and ultimately expressed an opinion that defendant had committed an offence under the Act by employing a boy under 12 years of age, and, therefore, convicted defendant, and fined him 40s. and costs.

THE CASE AGAINST THE MANAGER.—Mr. Dewes also appeared in the above case against the manager of the colliery, Mr. Cunliffe, who was summoned under a separate indictment. This prosecution was also instituted by the direction of the Secretary of State. Mr. Minster, solicitor, appeared for the defendant. The formal evidence was given as to the age of the boy Bull, and as to the production of the certificate to defendant by Mr. Tansley three weeks before the accident. For the defence, Mr. Minster contended that as the manager had instructed Mr. Tansley to discharge the boy immediately upon the production of the certificate no blame rested with Mr. Cunliffe. Mr. Minster then referred to a case in which it had been decided that in the case of a number of girls illegally employed in a factory the manager was not responsible, inasmuch as he had no knowledge of their employment. Mr. Dewes, for the prosecution, maintained that the case cited referred to the old Act, and that the present Act imposed upon the managers the responsibility, and Mr. Cunliffe was in this case aware that the boy had been employed in the mine, it was his duty to ascertain that he had really been discharged. Had the boy been employed without the knowledge of defendant, then only it might be reasonable to suppose he had acted in good faith, and under such circumstances only could it be contended that the case referred to would apply. The magistrates decided to convict the defendant, and ordered him to pay a fine of 40s. and costs.

THE COLLIERY EXPLOSION AT BARDSELY.—The inquest on the body of Andrew Matley, who died through injuries received by the explosion at the Diamond Pit, Bardseley, was resumed on Tuesday, by Mr. Price, at the Wellington Inn, Waterloo. Mr. Dickinson, Government Inspector of Mines, said that having heard of the explosion he went down the pit on the Wednesday following the Sunday morning at which it took place accompanied by Mr. Wild, the manager, and they examined the places where the lamps were found. For about 12 or 15 yards along the working face the floor was ripped up and the gas was still pouring out at a considerable rate, and firing in the lamps. There was no doubt that the gas came from this rent, that it was a sudden outburst, and that the gas, mixing with the air in the return airway, passed over the men's lamps at such a velocity that it fired through the gauze. From experiments which he had seen made, fire-damp would, under such circumstances, fire through the Davy lamp without any difficulty. At a velocity of from 480 feet to 500 feet per minute, or 8 feet per second, an explosive mixture would pass through the safety lamp, which then ceased to be any protection; and the men, unless they had a canister, or some water, or some means of smothering it, were perfectly powerless. The owner of the mine had since undertaken to have a canister ready in the event of the men being overtaken in this way. (Mr. Dickinson) examined the safety lamps. They were of the ordinary description used throughout the country. One had 26 parallel wires to the inch, and the other 28; 28 was the standard mesh; but the standard mesh would fire at the velocities he had named. In a fiery mine like this they ought not to have been working pillars back so near the shaft as they were doing. They ought to have got all their coal before beginning so near the shaft. He did not think the airways should be left so as to have to be prepared on Sundays. It was an unusual thing in coal mining, and was not necessary. In some collieries it was the regular practice to get all the coal about the bottom of the shaft; but in this district the boys had the mines were fiery, he was glad to see it was not the practice. It was very lucky that the gas fired as soon as it did, for if it had time to fill a larger part of the workings there would have been a general explosion, which probably would have smothered men a ½ mile away. The jury at once returned a verdict of accidental death.

COAL TRADE.

Mr. J. R. Scott, the Registrar of the London Coal Market, has published the following statistics of imports and exports of coal into and from the port and district of London, by sea, railway, and canal, during April, 1873:—

IMPORTS.				
By sea.		By Railway and Canal.		
Ships.	Tons.		Tons.	
Newcastle.....	143	99,755	London and North-Western.....	102,126
Seaham.....	22	7,026	Great Northern.....	91,888
Sunderland.....	97	59,273	Great Western.....	53,454
Middlesbrough.....	3	732	Midland.....	126,702
Hartlepool.....	80	25,467	Great Eastern.....	46,719
Scotch.....	54	10,262	South-Western.....	3,918
Welsh.....	9	3,226	London, Chatham, and Dover.....	1,144
Yorkshire.....	66	8,234	South-Eastern.....	1,211
Small coal and cinders.....	10	1,849	Grand Junction Canal.....	1,211
Culm.....	1	416		
Total.....	485	216,235	Total.....	424,912

Imports during April, 1873..... 339 208,124 Imports during April, 1872..... 400,803

Ships.		Tons.	Ships.		Tons.
Jan. 1 to April 30, 1872.	1764	953,893	Jan. 1 to April 30, 1872	1,662,593	0
Jan. 1 to April 30, 1873.	1768	922,354	Jan. 1 to April 30, 1873	1,642,738	0
Increase in the present		—	Decrease in the present year		9,857
year	4				
Decrease ditto		31,539			

Exports List, showing the distribution of coal imported into the port or district of London, by sea, rail, and canal, and afterwards exported coastwise or to foreign parts, or sent beyond limits of London district, by rail or inland navigation, during April 1873:—

London district, by rail or inland navigation, during April 1873.....	1,662,592	1872.....
Railway-borne coal passing "in transitu" through district.....	45,117	1871.....
Seaborne coal exported to British possessions, or to foreign parts, or to the coast of the country.....	6,187	1870.....
Ditto, sent beyond limits by railway.....	2,217-53,531	1869.....
Ditto, by canal and inland navigation.....	46,524	1868.....
Railway-borne coal exported to British possessions, or to foreign parts, or to the coast of the country.....	154-46,524	1867.....
Ditto, by canal and inland navigation.....	30	1866.....
Total quantity of coal brought into port and exported in same ships during April, 1873.....	150,000	1865.....

Exports List, showing the distribution of coal imported into the port or district of London, by sea, rail, and canal, and afterwards exported coastwise or to foreign parts, or sent beyond limits of London district, by rail or inland navigation, during April 1873:—

Increase in the present year	4,301
IMPORTS AND EXPORTS.	
Comparative Statement, Jan. 1 to April 30, 1872 and 1873.	
Decrease in imports by railway	Tons 9,857
Ditto by sea	31,539 = 41,396
Increase in exports	9,371
Net decrease in trade within the London district.	

Imports and Exports, Comparative Statement, Jan. 1 to April 30, 1872 and 1873.

Imports.	Exports.
Imports by sea.....	Imports by sea.....
Imports by rail.....	Imports by rail.....
Imports by canal.....	Imports by canal.....

Net decrease in trade within the London district..... 6,207

HOPEFUL VIEW OF THE TIN TRADE.

[From Messrs. SARGANT and SON'S "Metal Price Current," London, May 2.] Since April 4 the market has been gradually declining, though the combination of a variety of causes. In the first place consumers supplied themselves very freely in the Dutch sale; they have consequently wanted very little since, and as Straits has been arriving plentifully, and further large parcels are due very soon, there has been a desire on the part of holders to keep moving. Then, again, speculation has been weak, and some holders who might have been expected to support the market have turned sellers. We have, therefore, to report a decline of 6l. per ton, which, with the fall that took place on the occasion of the Dutch sale, makes a good 9l. per ton for the whole month. Statistics create in some quarters the impression that this fall is quite natural; but a careful examination of them gives us a totally different opinion. There is an increase of about 300 tons in the total aggregate of supplies as compared with the previous month, and a fall in value of 8l. per ton. Then, again, there is an increase of 2400 tons in the total figures as compared with last year, but the whole increase is in the Trading Company's unsold stock. This is owing to purely exceptional circumstances, and none can be sold till next September, when small bit monthly sales will be commenced. If we disregard this stock, which is absolutely out of the market, we find that of tin really available for consumption there is only just the same quantity that there was this time last year, when Straits was selling at 158l. per ton. One point of very great importance in the future is the requirements of America. For the first four months of this year the States have only taken 459 tons from the Straits against 1287 tons same time last year. We may fairly hope that the tin trade will revive, in which case there may be a sharp competition for tin in the East, and diminished shipments to England. At present the shipments of tin to England have been 2360 tons, against 2778 tons same time last year. We see by practical experience that the accounts of tin to come from Australia have been grossly exaggerated. The actual quantity sold in the four months represents about 400 tons of metal, and judging by what is landing, and what is known to be doing, the next four months will be about the same. The deliveries during April were 652 tons Banca, 59 tons Billiton from Holland, and 518 tons Straits, &c., from London, making 1229 tons, from which must be deducted 140 tons Billiton and Banca were here, making the net delivery for the month 1113 tons, against 1284 tons in March, 1872. The total deliveries of the four months this year are 3626 tons, against 4318 tons same time last year. The exports from the Straits to London, in April, as advised by wire, are 671 tons, but none has been shipped to America—Straits: gradually declining from 145l. to 138l., which is the closing rate. Some considerable bear sales for May to August delivery have been effected, from 142l. to 136l. Dutch: there has been very little doing since the sale. Banca is quoted firm at 154l. and Billiton 82 ½. English: Has declined in the same proportion as Straits, and seems to be in fair supply.—Australian Tin Ores: About 114 tons have been disposed of by tenders, at prices ranging from 5l. to 92l. 2s. 6d. per ton. The total quantity thus disposed of this year amounts to 638 tons, representing in round numbers about 490 tons pure metal, for the four months.

SPANISH INDIGO.—The quarterly sales commenced on Tuesday, and were abruptly drawn to a close on Thursday. It appeared quite evident that the orders generally were unusually restricted, and although holders showed every disposition to meet the market freely, they were compelled to withdraw a considerable quantity, there being little disposition to purchase at even the best price quoted below. The declarations amounted to 4179 packages, comprising 59 Guatemala, 107 Carracases, 157 Mexican, and 225 New Granada. Of the above quantity about 3000 packages are of recent import, the residue consisting of remnants and second-hand parcels. The selection upon the whole, was very indifferent, a large proportion consisting of low medium and undesirable qualities. Prices ruled very irregularly throughout, ranging from 3d. to 6d. per pound below last sales' prices. The total quantity sold does not exceed 1096 scores. Subjoined are the general quotations:—Guatemala—Flores, 7s. to 7s. 5d.; Solares, 6s. to 6s. 5d.; Cortes, 5s. 5d. to 5s. 5d. per lb. New Granada, 2s. to 7s. 5d.; Mexican, 6d. to 3d. per pound.

CHEMICALS AND MINERALS.—(Messrs. J. Berger Spence and Co., Manchester, May 3.)—Boda: Cream caustic, 60 per cent., 20l. 5s. to 20l. 10s.; white, 21l.; soda ash, 5d. to 3d.; soda crystals, 7d. 5s. to 7d. 10s.; bi-carbonate, 10s. 10s. 6d.; 2s. 6d.; Glauber salts, 3s. 17s. 6d.; Borax: Refined, 10s.;—Sulphate of Soda: 15s. 3d. to 15s. 6d.; Potash: Muriates, 80 per cent., at 5l. 5s. 6d. per cwt.; Red, 3s. 1d.; yellow, 1s. 4d. to 1s. 5d.; chloride, 1s. 3d. to 1s. 4d.; chromate, 8d.; potashes, 3s.; pearl ashes, 5s.; Saltpetre: Foreign, 2s. 6d. to 2s. 9s. 6d.; refined, 3s. 6d.; Alum: 8l. 5s. for loose lump; in export barrels, 8l. 15s.; ground, 9l.; Bleaching Powder: At 12l. 15s.; Ammonia—Sulphate: White and grey, 17l. 15s.; brown, 15l. 15s.; 23 per cent.; carbonate, 7d.; murate, 32l. to 37l.; all ammoniac, 1s. 4d.; 2nds, 4s.; Iron Salts: Green and red copperas, 7s.; dry copperas, 5s.; Copper Salts: Sulphate of copper, 32l.; Arsenic: 11l. for white powdered;—Acid: Tartaric, at 1s. 7 ½d.; oxalic, 9 ½d.; sulphuric, 3l. 10s. to 3l. 15s.; carbolic, 1s. 3d.; Magnesia: Epsom salts, 4s. 10s. for refined;—Fitch: 24s. to 26s.; Benzole: 30 per cent., 3s. 3d. to 3s. 6d.; 50 per cent., 2s. 6d. to 2s. 9d.; 90 per cent., 3s. to 3s. 6d.; Wood Pulp: Moist, 14l. per ton of 47 pulp; dry, 14l. 10s.; China-clay, 42s. to 45s. per ton.; Pyrites: Spanish copperas, 8d.; non-cupreous, 10d.;—Phosphates: High strength, 8s. to 9s. per cent., 1s. 4d. to 1s. 5d. per unit; Extramadura, 1s. 3d.; Ordinary, 60 per cent., 1s.; precipitated phosphate of lime, 40 to 50 per cent., 5s. 10s. to 6l. 10s.; super-phosphates, 2s. 6d. to 3l. 10s. to 3l. 12s. 6d.;—Manganese: Ores, 14s. for 70 per cent.—Iron Ore: Hematite, 25s. to 30s.; oolitic, 7s. 3d. to 8s. 3d.;—Iron: "Ayrshire" Yorkshire pig iron, No. 1, 129s. 6d.; No. 2, 124s. 6d.; No. 3, 122s.; No. 4 foundry, 121s.; No. 4 (foreign), 121s. net cash, or 2s. extra four months' bills; Scotch pig, warman, 111s. 6d. to 112s. 6d.; Staffordshire bars, 15l. to 16l.; hoop iron, 16l.; gas tubes, 25 per cent. off new list; boiler tubes, 10 per cent. premium.—Copper: English tough ingot, 88l.; Chili bars, 88l. to 90l.;—Tin: English ingot, 145l.; Straits, 136l.;—Tin-Plates: Best coke, IC, 39s. to 40s.; charcoal, IC, 44s. to 46s. per box.—Lead: Best English soft pig, 23l. 15s. to 24l.; refined red lead, 25l.;—Zinc: French star, 60l. to 62l.;—Spelter: Silesian special brands, 27l. 15s. to 28l. 5s.; English, best brands, 26l.

COMPLETION OF THE AUDENRIED SHAFT.—The completion of the Audenried shaft of the Wilkes-Barre Coal and Iron Company was celebrated in a most liberal manner by a grand dinner, given by Kenrick and Co., mining contractors and sinkers, to their employees and friends, at the Luzerne House. The Audenried shaft was commenced about two years ago, and ever since its commencement the contractors have met with difficulties that at times would have baffled less determined men than Kenrick and Co., but with their indomitable energy and perseverance, with the kind assistance of the Wilkes-Barre Coal and Iron Company, have accomplished the object for which they set out—the reaching of the bottom of the shaft, which proves to be a chip of the old block, pure as the parent, and 22 feet in thickness. This vein was reached at a depth of about 900 feet.—*Record of the Times, Wilkes-Barre, Pa., U.S.*

ENORMOUS YIELD.—The bullion yield of the Belcher Mine for the last ten days is enormous. The mine shipped \$25,000 on the 2nd, \$43,000 on the 3rd, \$79,000 on the 4th, \$24,000 on the 5th, \$22,200 on the 6th, \$117,000 on the 7th, \$63,000 on the 10th, and \$84,549-50 to-day—making \$457,000 for ten days, or nearly \$50,000 per day.—*Virginia Chronicle, April 10.*

LONDON GENERAL OMNIBUS COMPANY.—Traffic returns for the week ending May 4, 1873, 40,167, 40. 1d.

NEW WHEAL SETON.—At a meeting on April 29 the costs of the mine for the four months ending February showed a debit balance of £121*s*. 1*s*. 3*d*. A call of 3*s*. per share was made. Captain Bath's report (published among the mining correspondents) was received and adopted. The lord, Mr. Basset, having kindly consented to the subdivision of the shares into a number not exceeding 1200, it was resolved that they be subdivided into 1200. The meeting unanimously approved.

of the resolution passed on March 22, that a new shaft should be sunk on the north part of the mine, to take the lode at the 70 fm. level from surface, or 80 fathoms below the adit.

ALDERLEY EDGE.—At a general meeting of shareholders, held at the mines on April 30, a further dividend of 5s. per share was declared, making the total amount of dividends paid 11s. 8d. per share.

WHEAL OWLES.—At the meeting, held at the mine on May 2, the accounts for twelve weeks, to March 1, showed a credit balance of 1276l. 1s. 5d. Work performed during the quarter:—112 fms. 4 ft. driven in levels, and 45 fms. 1 ft. sunk in shafts and winzes; 43 paces stopping for tin on tutwork, and 12 pitches working on tribute.

BALMUNHEER.—At a special meeting held at Falmouth, Captain John Taylor, the purser, in the chair, it was resolved that a call of 10s. per share be made; also that Capt. Henry Phillips be appointed an agent of the mine at a salary of 7l. 7s. per month. The report of the agents—Captains Tonkin and Captain Harris—was very good, and stated that the new shaft was holed to the 20 fm. level, 8 tons of tin had been sold last month, and a considerable increase in the returns might be looked for at an early date. The axle is expected to be ready within a few days. The tin is of fair quality, containing about 26 lbs. to the ton.

VANCOUVER COAL MINING AND LAND COMPANY.

The annual meeting of shareholders will be held at the City Terminus Hotel, Cannon-street, on Tuesday, when the following report will be presented:—

The accounts for the six months ending Dec. 31 show a profit of 7361l. 18s. 4d. The sales of coal have not equalled those of the previous six months; for the whole twelve months, however, they have exceeded those of any former year.

MINING ON THE MAINLAND.—Almost the entire production of the company's mines has been hitherto from the Douglas Pit, on the mainland. The output from this mine for the half-year was 21,675 tons, or a daily average of about 140 tons. At the depth where the shaft cuts the Newcastle seam exploratory headings have been driven, but up to the present time only soft coal has been found.

MINING ON NEWCASTLE ISLAND.—The work undertaken on Newcastle Island in 1868, called the Newcastle slope, has been continued by the contractors. The coal raised from this mine during the six months was only 500 tons. The second operation on the island, which was first mentioned by the directors in their report of October, 1871—and which, to obviate confusion, will in future be called the Fitzwilliam Mine—has been also worked by a slope, already carried down 406 yards, through coal of excellent quality. When the hauling engine is erected, and the levels driven, a regular and increasing supply of coal may be counted upon from this mine.

At the beginning of the year a subsidence of a portion of the roof of the Douglas Mine (mainland) occurred in the vicinity of a swamp, which resulted in a large influx of water, and served to retard operations in the lower level. The output during the early part of the year was thereby considerably reduced, and it is feared that the production of the current six months from this mine will be below the average. All the pumping power available has been employed to raise the water, and cuttings have been made on the surface to drain the swamp. By the last advice the managers reported that the mine would be free from water at an early date. The directors recommend that a dividend for the half-year at the rate of 10 per cent. per annum be declared, which will absorb 4130s., leaving a balance of 3231l. 18s. 4d. to be carried forward.

[For remainder of Meetings see to-day's Journal.]

FOREIGN MINING AND METALLURGY.

The stock of Banca and Billiton tin in Holland at the close of April, 1873, was estimated at 146,104 ingots, as compared with 68,857 ingots at the close of April, 1872. There was also a considerable quantity of tin under sail to Holland at the close of April. Chilean copper in bars has made 96l. per ton at Paris, with delivery at Havre; ditto in bars, with delivery at Paris, 98l. per ton; English tough cake, 98l. per ton; and Corocoro mineral, pure standard, 94l. per ton. At Marseilles, Spanish copper has realised 92l. per ton; and refined Chilean and Peruvian, 92l. per ton. At Rotterdam the quotation for Drontheim has been 50 fls. to 52 fls.; and for Russian crown, 51 fls. At Paris, Banca tin has made 154l. per ton, with delivery at Havre or Paris; Straits, delivered at Havre or Paris, 154l. per ton; and English, delivered at Havre or Rouen, 153l. per ton. At Rotterdam the quotation for Banca has been 84½ fls.; and for Billiton, 83½ fls. The lead markets have not materially changed during the last few days; at the same time, they have not presented quite so much firmness. French lead, delivered at Paris, has brought 24l. 8s. per ton; Spanish ditto, delivered at Havre, 24l. 8s. per ton; English ditto, delivered at Havre, 23l. 16s. per ton; and Belgian and German, delivered at Paris, 24l. per ton. The zinc markets have been quiet, but prices have been generally well maintained. Silesian zinc, delivered at Paris, has brought 28l. 16s. per ton; other good marks, delivered at Havre, 28l. 8s. per ton; and ditto, delivered at Paris, 28l. 8s. per ton.

The state of the Belgian coal trade has not been very materially modified. There are, however, numerous signs of a reaction in affairs, and orders show less strength, especially as regards coal for metallurgical purposes. The fall in prices is certainly not very sensible at present, but coalowners seem to exhibit increasing uneasiness respecting it. The emigration of working miners to Germany, which has been noted of late, seems to be drawing to a close, but many men are leaving the Belgian coal mines for the country districts, and a want of labour is accordingly experienced. Under all the circumstances, a fall in prices appears imminent and irresistible. At Charleroi there is some demand for coal from the sugarworks, but very little from the glassworks or rolling-mills. There is a general uncertainty in prices, and the small contracts concluded cannot be accepted as furnishing any indication as to the real state of affairs. In the Mons basin prices are still maintained with tolerable firmness, because workmen being scarce, stocks are re-formed with very considerable difficulty. Coking coal has been dealt in at 17s. 9d. per ton; coke has been further declining. The dividend of the Belgian Collieries Company for 1872 has been fixed at 1l. 12s. per share.

The French Coal Trade has been very quiet during the last few days—too quiet, in fact. The Paris market has especially been feeble, little or no readiness being displayed to renew contracts which have run out, notwithstanding the check, and even the downward tendency which prices have exhibited in the Pas-de-Calais. In the Centre and the South of France the coal trade has exhibited more firmness than in the North. There has been even an advance at St. Etienne. St. Etienne has never been accepted, however, as a controlling market, and it follows very irregularly the course of the other continental markets. The turn which affairs have taken in the Centre may, then, be regarded as resulting purely from local influences, and it may be affirmed generally that the advance in quotations has been definitely checked, and that a fall is even apprehended. The Government is said to be contemplating sundry measures for cheapening coal in France. Thus, it is said to be the intention of the French authorities to compel concessionaires to turn their concessions to account, and to grant new concessions. Other remedies suggested are the increasing the number of pits, lending the assistance of mining engineers, and encouraging new mining appliances and inventions with official premiums. It is further suggested that the railway companies should be required to improve and extend their means of transport, and at the same time to reduce their tariffs. The dividend of the Grand Combe Mines Company for 1872 will be 3l. 4s. per share. The Bessèges Colliery Company has fixed its dividend for 1872 at 2l. 4s. per share.

There is a rather serious slackening in the French iron trade; transactions are falling off, and the great movement of the last two years appears to be losing its strength and animation. At the same time, the fact must be noted that the French metallurgical interest seems still hopeful, and that there do not appear to be any very decided fears of a great reaction in affairs. The influence of the fall which has taken place in neighbouring markets can scarcely remain unfelt, but it will only be experienced indirectly, and if the political horizon is not overcast the spring does not seem likely to witness any very marked decline in the French iron trade; such, at least, is the opinion current in many experienced quarters. Ironworks, forges, and construction workshops are all actively employed, but the advance in their products has been thoroughly checked for the present. The Champagne district still maintains its prices pretty well, but in the Nord quotations have somewhat given way; transactions in the latter district have been rather few in number, and firms appear disposed to make fresh concessions. At Paris there has been a slight revival in affairs; coke-made iron has been dealt in at 12l. 8s. to 12l. 12s. per ton. The La Nouvelle Works, in the Aude, have been disposed of to M. Philippart, representing a Belgian company; the purchase price was 84,000l. The concern known as the Forges et Chantiers de la Méditerranée has been paying the balance of its dividend for 1872, or 1l. 12s. per share.

The upward tendency which so long characterised the Belgian iron trade has been definitely checked, and the reaction in prices

is already sharp. The rolling-mills have little or no work, a considerable number of puddling-furnaces are being blown out, and on all sides sellers are making concessions in prices. An adjudication for rails which took place a few days since for the Belgian State system furnishes abundant proofs of the course which affairs have taken. At a corresponding adjudication, on March 19, the lowest price was 12l. 13s. 6d. per ton; this time the corresponding lowest rate was 12l. 4s. per ton, showing a fall of 9s. 6d. per ton in about six weeks. The Monceau-sur-Sambre Works, which in March tendered for two lots of steel rails at 20l. 16s. to 21l. 12s. per ton, this time reduced their rates to 20l. 4s. per ton. The Bouquevaux Works, at La Louvière, nearly maintained their former rates; but, on the other hand, the Montigny-sur-Sambre Works, which had tendered in March at 12l. 13s. 6d. per ton for iron rails, raised its tender this time to 13l. 3s. 4d. per ton. The lowest tender for steel rails in March was presented by the Angleur Steelworks—viz., 19l. 12s. per ton; this time the lowest offer was 19l. 2s. per ton. The lowest tender was again presented by the Angleur Works, which seem to pursue an independent line of action, and which, it will be seen, reduced their rates 10s. per ton, the management, probably, considering that it was imperatively necessary to adopt this course. It is noticeable, also, that at the late adjudication for the State system the range in prices was much more considerable than in March; thus at the April adjudication the difference between the lowest and the highest tenders was 2l. 3s. per ton. Opinions would thus seem to differ a good deal as to the course and prospects of the iron trade, and each firm appears to fix its prices according to its hopes, or rather according to its necessities. The Government of the colony of Victoria, Australia, has intimated that Belgian firms will be permitted to compete with English for the supply of 5500 tons of rails required for railways now in course of construction by the Victorian Government. Prices in Belgium have displayed a downward tendency of late, but it must at the same time be remarked that they have been to a great extent nominal. The ironfounders of the Charleroi basin decided at their last meeting, which was numerously attended, to maintain for May the tariff adopted for April. This decision would probably, however, be modified by "circumstances." Most of the great Belgian mechanical establishments have forwarded exhibits for the Vienna Exhibition.

FOREIGN MINES.

PORT PHILLIP AND COLONIAL GOLD.—Telegram, dated Melbourne, May 2:—Month ending April 23, yield per ton 4 dwts. 13 grs.; deep level, 12 dwts. 5 grs.

CHICAGO (Silver).—The directors have received a telegram from their agent, that possession of the property was taken on behalf of the company on the 3d inst. Operations at the mines forthwith.

ALMADA AND TIRITO.—The following telegram has been received by the directors of the above company from Mr. Clemes:—March profit for month, 9820s. 12d. 10s. sterling. Profit for month, deducting London expenses, 1111l. 16s.

ST. JOHN DEL REY.—Morro Velho, April 1: Vertical Shaft: The work of sinking has been carried on regularly, and with few interruptions, since the last advice. The progress during March has been in A shaft, 3 fms. 3 feet 1 in.; total depth, 153 fms. 4 feet 8 in.; B shaft, 3 fms. 3 feet 1 in.; total depth, 153 fms. 5 feet 4 in. Mining at shaft monthly. Some of the mineral was brought up yesterday, and is now being broken, and 12 heads of the Herring stamps should commence reducing it to-morrow. One side of the Gila stamps will commence to-day on the Matto Virgin mineral. Sump of A shaft is becoming more solid.

ROSSA GRANDE.—Extract from letter dated March 28: Bahu: Very fair progress is being made in sinking the sump-shaft, and the lode continues to open out satisfactorily, being about 6 feet wide, and producing good samples of gold in the lode. The lode in the 28 shaft has become more contracted since last reported on, being at date 3 feet 6 in. wide, but judging from the samples it is improved in quality, and it presents favourable indications of opening out wider again within a short distance. In the 28 shaft I have no change to report, the lode continues about 3 feet wide, of average quality. The lode in the 18 shaft is about 1 ft. 6 in. wide, of good quality. The lode in the rise in the back of this level is 2 feet 6 in. wide, of average quality. The lode in the 10 shaft is very small, and the ground is unusually hard. The lode in the winze-sinking below this level is improved in size and quality since last reported on. In the 10 shaft the lode is 1 ft. 2 in. wide, of good quality. Cachoeira: In the 20 shaft we continue to lay open good stopping ground, the lode is 3 feet wide, of good quality. We have been obliged to put in some very strong timber in the stoves in this mine in order to prevent the same from collapsing.

GENERAL BRAZILIAN.—Captain Thos. Treloar, March 26: By this opportunity I have nothing new to communicate. Our works are progressing satisfactorily, one and all are pulling in the right direction, and as already advised in a very few months more I hope we shall have shown that gold is here in abundance, heavy and deep. Indeed it is somewhat doubtful whether our works have yet reached the main auriferous bed of footings. In my last I mentioned that the state of some, if not of all, the shoots at St. Anna will be ascertained in a very few months, but it should have been the shoots of Mottas group. At Itabira some auriferous samples have been taken where we have commenced explorations on the lode, but these probably have no reference to the known shoots of gold we are aiming at.

BATTLE MOUNTAIN.—May 6: On April 10 Capt. Richards reports: Virgin: In the 145, north of Daniel's winze, the lode is of a promising character, and producing occasional stones of very rich ore; being the deepest point in the mines it adds very materially to the present and prospective value of same. The stoves in the back of the 145, north of Daniel's winze, are producing some rich ore, and the exceedingly promising character. In the 113 north the lode is small, but promising improvement as we advance; this drift for the time is suspended, and the men placed to open out stoves in the back of same, with a view to raising increased quantities of ore; the said stoves will be recognised in future as stoves south of John's rise. The stoves in the back of the 113, south of John's rise, contain a lode of 1½ ft. to 2 ft. wide, which in places produces some rich ore, and we hope large quantities of same will be taken herefrom. Hooper's rise, in the back of the 73, is progressing very satisfactorily, and when communicated with the surface will give to the workings the needed ventilation through the hot summer months, and enable us to work the ore ground, both north and south of said rise with ease and dispatch. Jack's stoves in the back of the 37 north, is turning out fair quantities of ore, and the lode is very promising. Pascoe's stoves, in the back of the 37, produces fair quantities of ore. The mines, on the whole, look well, and my object has been, and will be, to make them the most productive on this coast. On April 17 Capt. Richards reports: We have opened stoves in the back of the 113, south of Truscott's winze, which are producing fair quantities of ore of very good quality. The lode in Daniel's winze is very important and valuable. The stoves in the back of the 145, north of Daniel's winze, are producing some rich ore in red oxide and black sulphurets. There are 744 sacks raised in three weeks, making 3035 sacks (about 155 tons) ready for shipment.

COLORADO TERRIBLE.—The agent's letters, dated April 19, announce the sale of three parcels of ore to the Chicago Smelting Company for \$751.34. Also, a sale to the English Smelting Company of a small parcel of ore for \$751.34. The agent has arranged to continue to sell ore to the English Smelting Company. There are, therefore, now three buyers of ore in Georgetown. The agent states that the fine body of ore in the 5th level continues, and that there is good ore in the 4th level, and adds:—This week we have raised some splendid ore, which will enable me to get off the 28th shipment of 10 to 11 tons of first-class ore, which will assay 600 ozs. of silver per ton. If the ore comes out of the mine the next two weeks the same as it has done this week I shall get away another shipment by May 5.

CRESCENT (Gold).—Capt. Stetson, April 13: No material change in the mine since I wrote last. I am pumping out of the 4th level, and am down this morning 22 feet below the 3rd level. I think that the water will be cut very well. The ore from the first level of the "Pet" is looking better as we go west; lode 3 feet wide; I am working with four men here. On the first level, between winzes A and E, I am stopping with four men. These are the only places that will pay to take out that I have found as yet. The cross-cut from Pet to Horse-shoe is now in 90 feet; I have cut two ledges in running it, which show a little gold, but not enough to take out; in about 10 feet more we shall, I believe, be through. On the 3rd level of the Crescent I am carrying the drift east, and am now 30 feet from where the lode was struck. The lode is 25 feet thick, but thus far it will not pay to crush; however, I am in hopes to find pay ore by running 30 feet further in. In the 2nd level of the South Pet lode there is a large body of ore, but not enough gold in it to pay for crushing thus far. I have sunk the prospecting shaft mentioned in my last 18 feet in the gravel, and think the bed rock is about 7 feet deeper at that spot. The gold for February after melting produced 8475, and I have now forwarded to San Francisco the produce of the March run, which I estimate at about \$850.

HOLCOMBE VALLEY (Gold).—C. R. Bennett, April 5: The main shaft is now about 49 ft. deep, and the Mammoth incline No. 1 cleared and timbered to about 89 ft. deep. The Mammoth incline No. 2, for which there has been a contract let for the sinking of 50 ft., is now about 59 ft. deep; the vein still looks remarkably good. Mr. Bonner, the lumber contractor, is busily engaged cleaning up and fixing the saw-mill, so as to start about the 1st of May. The weather is now and has been for the last month, splendid, and the epidemic is unfortunately aging through California, which may make it a difficult matter to hire teams if required.

BIRDSEY CREEK (Gold).—G. S. Powers, April 19: Waloupa: The water was turned on to this claim on the 17th, and thus far is not working very satisfactorily on account of being hard, but I hope to overcome this difficulty after washing through the outer rim, and I will report further as the washing progresses. The shaft tunnel was 190 ft. on April 15, and the contractors are making about their usual headway, having completed their 300 ft. on April 5, leaving 82 ft. to run to shaft from that date. The weather continues dry and hot, and we cannot look for other than a short water season. The Uncle Sam two heads are running steadily, with about the same prospects for the month of March—Neos and West Neos: I am cleaning ground in Brown's Hill with two men, and they are making it pay very well, which will help out the profits for this month.

G. S. Power, May 9 (Telegram): We have cleaned up after a run of 30 days. Gross returns, \$12,000; profit, \$7750. I send you a remittance of \$6500. The tunnel and shaft cost is \$1200.

PONTIGNAUD.—W. H. Rickard, May 1: Roure: The sinking of the new engine shaft has gone on well, it being holed to the adit level, and the sinking below that level commenced. The rise in the back of the 60, towards this shaft, is in stiff ground. The 100 cross-cut east is rather hard.—Virginia Lode: The 80 metre level north yields a little saving work. The 60 north yields ¼ ton of ore per

rent metre, and the same level south yields ¼ ton per metre. The 40 south is poor but the northern end yields stones of ore. The 20 south yields ¼ ton of ore per metre. The rise in the back of this level yields ¼ ton per metre. The 20 north is in a large strong lode, yielding coarse saving work. The adit north yields ¼ ton per metre.—Mill Lode: The adit south is in a kindly lode, worth ¼ ton per metre. The rise behind this end yields ¼ ton per metre. The 20 plat is cut, and the cross-cut towards the lode will be immediately driven. Our tribute pitches on the ground is easy, requiring heavy timber. The 100 north yields a little saving work. The tribute pitches have fallen off in value a little on the whole.—La Brosse: The 140 cross-cut, east of Bassot's shaft, continues hard. The 120 metre level south yields ¼ ton of ore per metre. The winze below this level is poor. The 80 metre level south is in a fine ore lode, yielding 1 ton of ore per metre. The 80 south has again entered good ore ground, worth ¼ ton of ore per metre. The winze in bottom of the 60 yields ¼ ton per metre. The tribute pitches in this mine yield ¼ ton of ore per metre. The 70 north, on St. Matthew's lode, yield ¼ ton of ore per metre. The same level south yields a little saving work. The 50 north is poor, the lode being damaged by a slide. The winze below this level is unproductive. The 20 south, of winze, cross-cut in the 8 north continues hard. Our stoves in the back of the 70 have a little improved. The tribute pitches are without much change.—Sudbury: Our dressing has gone on without interruption, the sampling has amounted to 250 tons. —St. Amant and Giroux: At St. Amant Susan's shaft has been idle this month, want of good miners. We have now set the whole of the sink to finish at 400 fms. per metre; the rock is hard and wet. The 25 metre level north yields stones of ore. No. 1 winze has yielded occasional stones of lead. We have not a second winze to prove the ore ground, in which but little is done. At Giroux we have opened a level on another lode, whose appearance not being very kindly we have since suspended it.

WEST CANADA.—April 8: Huron Copper Bay: The stope in the bottom of the 60, east of Bray's shaft, will yield 2 tons of copper ore per fathom. In the bottom of the 35, east of Bray's, the stope is yielding 2½ tons per fathom, and to the west of Palmer's shaft, in the bottom of the same level, the stope is yielding 3 tons per fathom.

BENSBERG.—J. W. Hoffmann, May 3: Manager's Report for April: Our operations in the open-cut were this month chiefly confined to getting carbonate from the vein at the west end, which we followed down to the water level, and obtained 200 tons of carbonate averaging 50 per cent. lead and 6 grammes silver, worth, at present price of pig-lead, 9l. per ton. This we delivered, as usual, to the Stolberg Company. At the same time we got 140 tons of rock ore, as usual, to the average assay, which we stored for future dressing. Towards the latter end of the month we found that the water level had fallen 3 ft., and we were enabled to commence going deeper at the north side of the open-cut, where we have the fine ore mentioned in my report of Feb. 22. Here the ore is very much mixed with iron pyrites, which we consider indicates an improvement in the ore in depth, as the stone is very hard, and all require blasting with dynamite. The sinking has been let to 12 men to sink, timber, and haul, at 1½ lvs. per fathom, with the exception of 10 per cent. if they sink 2 fms. in one month. We obtained an additional staff of mechanics from the machinists to fix the dressing machinery, and this was rapidly reaching its completion. There are, however, still a few articles to be altered, among which is the washing trommel, and several things have been returned to us, altered, being made wrong, which we expect back daily. We are now fixing the water gutters, and water and steam pipes. We expect to have the whole at work in the course of May month. Two large shafts have been finished, and the movement made of an inclined plane to wind the stuff from the open cut by a steam-winch, instead of the slow and expensive mode of drawing it out by horses, as at present. The production of carbonate last week was 50 tons of ore per cent. average assay; we delivered 20 tons of 40 per cent. assay. Production of rock ore, 20 tons of 10 per cent. assay. Stock of ore on hand ready for market, 50 tons. I enclose draft on London for 1000l., received on account of ore sold.

[For remainder of Foreign Mines, see to-day's Journal.]

THE NEW ALMADEN QUICKSILVER MINE.

BY JAMES A. WHITNEY, M.E.

Mercury is the basis of many of the most important processes of metallurgy. Its natural ore is a sulphuret cinnabar; this is found in large quantities in this country only, at the New Almaden Mine, in California. The manner of working and the machinery there in use is what, two years ago last August, I went to see.

The mountain in which the mine occurs is situated 12 miles from San José, which has an iron foundry, and shows many signs of thrift, and is distant 50 miles from San Francisco. At the foot of the mountain is a gray hacienda, long and low; a road, steep but perfect in construction, curves in and out along the sides, terminating at last in a straggling village of low-roofed houses, where the miners dwell. Looking out to the right, as one ascends, there is seen the broad *Cerro de la Campana*, or valley of "The Little Captain," who, in old times, ruled in it an Indian tyrant. Plain yellow with harvest stubble, and dotted here and there by the symmetrical rounded tops of mighty live oak trees.

The approach to the mine is indicated by great heaps of earth thrown out on the slopes from prospect mounds, most of which are of great depth. Then is seen a shed covering the platform, *puenella*, where the ore is broken from the fragments of rock by hammers, the shed forming a continuation of the main tunnel, which extends into the mountain 800 feet. This is apparently about 100 feet in diameter. It is 1750 feet above the sea level, and 1200 feet above the level of the valley. From its inner end is sunk the shaft, which is 400 feet deep, and communicates with the different levels at the mines. Some of the tunnels of these levels are carried quite to the surface on the mountain side. We entered the mine through one of these, the Great Eastern, which affords egress for a portion of the ore cheaper than that afforded by the shaft, for the tunnels of each level, as in other mines, are furnished with tracks for the ore cars and, with very minor exceptions, converge to the shaft. The ore is emptied from the cars into one of two large buckets, and raised by steam-power to the top of the shaft, where by an ingeniously arranged device, the bucket is pitched forward and tilted over the level of the valley. The ore is dumped into the receiver is passed therefrom to cars running in the main tunnel, and by them conveyed to the *puenella*, where, as just mentioned, the ore is broken from the worthless rock by labourers furnished with long handled hammers. This is paid for "by the job," 50 c. per cargo of 300 lbs. The buckets are worked in a manner very much resembling the old double-bucket arrangement for drawing water from wells, and the advantages are the same in the one case as in the other. The lift of one bucket insures the simultaneous descent of the other, and the buckets balancing each other there is no loss of power in hoisting them, as with a crane. The shaft also works the pump rod, which I noted at the level of about 100 feet from the shaft. Like the bucket-rope, it is operated from the engine in the latter. To balance its enormous weight (for it extends from top to bottom, and is made of wood 4 in. square, strapped at the joints with iron) it has attached to it at intervals the inner ends of levers, furnished at their outer or opposite extremities with counterpoising weights, these balance bobs effectually steadying the movement. The crew of the mine informed me that these devices have long been in use in the mines of Cornwall, some of the timber pump-ropes, he stated, being as much as 600 fms. long, 18 in. square in cross-section, and connected at the joints by plates of iron 1 in. in thickness. The heavy bobs being placed at intervals of about 100 feet. The mine includes a horizontal area of about 2000 feet in length and 2000 feet in width; but the different levels increase the actual area worked over, so that the aggregate of tunnels amounts to many miles, the yearly increase being at the rate of 12,000 linear feet. The labour of tunnelling is distinct from that of extracting the ore, and is paid for separately. The cost varies, according to the nature of the rock, from 80 to 800 per cubic yard. The expenses for this item amounted in 1869 to 890,000. The ore getters, as they may be termed, are paid from 34 to 98 per cent. of cleaned ore. This yields about 8 per cent. of quicksilver, and the annual yield of about 50,000 flasks, 65 lbs. to the flask, of merchantable quicksilver.

One of the most interesting features of the mine is the blacksmith's shop, 250 feet below the main tunnel, and furnished with two forges, which serves the purposes of three smiths, two by day and one by night, for the work goes on continually by alternate gangs, and the forge fire flickers unceasing on the grey walls streaked with red cinnabar. This smithy is ventilated by a pipe from a fan arranged near the engine which works the buckets and the pump, and which, I should mention, is of 15-horse power.

The ore is, of course, extracted by blasting, and the drilling is done by hand; an operator sitting on his haunches and holding the drill, while another swings a sledge with careful and steady strokes. Gunpowder is used for blasting, a brief trial of dynamite having so prejudiced the miners against it that they refused to have anything to do with it. When a vein strikes a rich deposit of ore the whole is excavated, in whatever direction it may occur, and chambers are sometimes found there at some distance below the tunnels with which they communicate. In these are Spanish ladders, or *escaleras*, are provided for the miner. These are simple ladders, with notches or steps cut in them, and set at a slight angle from the perpendicular. Nothing more rude can be imagined, but the miners bring up loads of 200 lbs. with apparent difficulty. To do this, however, they must have the use of their hands, and hence the sack containing the ore is furnished with a strap passed over the forehead, and sustaining the sack upon the back and shoulders. One wonders to see the miners, tough Mexicans from Chihuahua and strong delvers from Cornwall, though they be, carrying such burdens under such rough conditions. But the wonder is increased when it is remembered that it is less than 50 years since the same system was universally in vogue in the coal mines of Great Britain, not only for men labourers but, as old encyclopedias show, for women also.

I have thus briefly sketched the mechanical adjuncts and operations of the mine. But the pleasantness of the landscape as we ascended the mountain, the cool waters of the tree-shaded spring at the top, the dim and dull, but grand and wild, sight of the heart of the rocks, and the fervent splendour of the almost tropical sun, came suddenly out from the cold caverns, are incidents of the visit which neither my companion (Mr. John W. Sledman) nor myself will be likely to forget.—*Iron Age* (U.S.).

THE MINING JOURNAL.—Now ready, strongly and neatly bound, price 1l. 12s. 6d., VOLUME XLII. FOR THE YEAR 1872. To be had through any newsgat or bookseller, or direct from the Mining Journal Office, 20, Fleet-street London.

FOR 1873.

POST FREE, TWO SHILLINGS, IN STAMPS.

BAILEY'S

ILLUSTRATED INVENTIONS,

(Fifteenth edition), 25th thousand, 1600 engravings, 150 pages, weight 10 ounces, illuminated covers. Published at a great cost by

J. BAILEY AND CO.,

INVENTORS, PATENTEES, BRASSFOUNDERS,

AND MANUFACTURERS OF

Engineers' & Contractors' Sundries, AND USEFUL INVENTIONS

Cotton Spinners, Railway Companies, Engineers, Colliery Proprietors, and nearly every description of Employers of Labour, County Gentlemen, &c., &c.;

ALSO OF EVERY DESCRIPTION OF

ENGINE AND BOILER FITTINGS,

PYROMETER INVENTORS AND PATENTEES;

ELECTRIC TELEGRAPH ENGINEERS

AND

TURRET CLOCK MAKERS;

Makers of the celebrated

AUTOMATIC CLOCKS,

For indicating the pressure of steam day and night, rise and fall of the tide, &c.

Winding Indicators, Signal Bells, &c., &c.

DEPARTMENTS:

BRASS FOUNDRY & STEAM FITTING DEPARTMENT.

ENGINEERS' SUNDRIES DEPARTMENT.

SMALL MACHINE, PUMP, AND FIRE ENGINE, &c., &c. DEPARTMENT.

CLOCK DEPARTMENT.

ELECTRIC TELEGRAPH DEPARTMENT.

All profusely illustrated, described, and priced.

J. BAILEY AND CO.,

ALBION WORKS,

SALFORD,

MANCHESTER.

The above is sent free to Working Men's Clubs, Mechanics' Institutions, or Improvement Societies.

BAILEY'S SPECIALITIES FOR 1873.

BOILER FEEDING.

THE GRINDROD

BOILER FEEDER,

Which keeps the water at one definite height day and night.

MUCH IN USE IN THIS DISTRICT.

THE

STILWELL WATER HEATER

AND

LIME EXTRACTOR.

THE HALLAM

GIFFARD INJECTOR.

These are all high-class inventions, and are with confidence recommended.

CIRCULARS ON APPLICATION.

J. WOOD ASTON AND CO., STOURBRIDGE

(WORKS AND OFFICES ADJOINING CRADLEY STATION),
Manufacturers of

CRANE, INCLINE, AND PIT CHAINS,

Also CHAIN CABLES, ANCHORS, and RIGGING CHAINS, IRON and STEEL SHOVELS, SPADES and FORKS, ANVILS, VICES, SCYTHES, HAY and CHAFF KNIVES, PICKS, HAMMERS, NAILS, RAILWAY and MINING TOOLS, FRYING PANS, BOWLS, LADLES, &c., &c.

Orab Winches, Pulley and Snatch Blocks, Screw and Lifting Jacks, Ship Knees, Forgings, and Use Iron of all descriptions. STOURBRIDGE FIRE BRICKS AND CLAY.

AWARDED TWENTY GOLD AND SILVER FIRST-CLASS PRIZE MEDALS

IMMENSE SAVING OF LABOUR

TO MINERS, IRONMASTERS, MANUFACTURING CHEMISTS, RAILWAY COMPANIES. EMERY AND FLINT GRINDERS, MCADAM ROAD MAKERS, &c., &c.

BLAKE'S PATENT STONE BREAKER,
OR ORE-CRUSHING MACHINE,

FOR REDUCING TO SMALL FRAGMENTS ROCKS, ORES, AND MINERALS OF EVERY KIND.

This is the only machine that has proved a success. This machine was shown in full operation at the Royal Agricultural Society's Show at Manchester, and at the Highland Agricultural Society's Show at Edinburgh, where it broke 1 1/4 ton of the hardest trap or whinstone in eight minutes, and was AWARDED TWO FIRST-CLASS SILVER MEDALS. It has also just received a SPECIAL GOLD MEDAL at Santiago, Chili.

It is rapidly making its way to all parts of the globe, being now in profitable use in California, Washoe, Lake Superior, Australia, Cuba, Chili, Brazil, and throughout the United States and England. Read extracts of testimonials:—



For illustrated catalogue, circulars, and testimonials, apply to—

H. R. MARSDEN, SOHO FOUNDRY,
MEADOW LANE, LEEDS,

ONLY MAKER IN THE UNITED KINGDOM.

THE DIAMOND DRILL.

PROSPECTING OR TRIAL BORING FOR MINERALS

The DIAMOND ROCK BORING COMPANY (LIMITED) is PREPARED to UNDERTAKE CONTRACTS at FIXED RATES for PROSPECTING or BORING for MINERALS of all kinds. Great speed is attained; work that formerly took years is done in the same number of months, and sample cores are brought up, showing the nature of the strata passed through, and enabling the minerals obtained to be analysed.

The company has a number of MACHINES in SUCCESSFUL OPERATION in different parts of ENGLAND, and the terms, with particulars, will be supplied upon application to—

THE SECRETARY, DIAMOND ROCK BORING COMPANY, LIMITED,
2, WESTMINSTER CHAMBERS, LONDON, S.W.

J. W. STEAD,

(Late of the Firm of HODGSON and STEAD),

MANUFACTURER OF WEIGHING MACHINES, WEIGHBRIDGES,

AND ALL DESCRIPTIONS OF WEIGHING PLANT FOR ALL NATIONS.

OFFICES AND WORKS:—

GLOBE FOUNDRY, PENDLETON, MANCHESTER.

SHOW ROOMS:—11, NEW BAILEY STREET, opposite the Railway Station, SALFORD.

COUNTER WEIGHING MACHINES,

PLATFORM " "

CART, WAGON, AND RAILWAY TRUCK WEIGHBRIDGES, with or without the "Improved Relieving Apparatus."

SELF-CONTAINED WEIGHBRIDGES, requiring no masonry or brickwork.

SELF-INDICATING and other Weighing Machines for Colliery Purposes.

The "CALCULATOR," specially for Contractors, Storekeepers, Bolt-makers, &c., indicating the weight by count or the count by weight. (No loose weights required.)

STEEL YARDS, &c.

WEIGHING PLANT, of any power or dimensions, to the standard of all nations.

CONTRACTOR TO RAILWAY AND OTHER COMPANIES, FOR MAINTAINING WEIGHING MACHINERY.

Globe Foundry is One Minute's Walk from the Pendleton 'Bus Office, and Four Minutes' from Pendleton Railway Station.

The Parys Mines Company, Parys Mines, near Bangor, June 6.—We have had one of your stone breakers in use during the last 12 months, and Capt. Morcom reports most favourably as to its capabilities of crushing the materials to the required size, and its great economy in doing away with manual labour.

For the Parys Mining Company,
H. R. Marsden, Esq. JAMES WILLIAMS.

The Van Mining Company (Limited), Van Mines, Llanidloes, Feb. 6, 1871.—Our machine, a 10 by 7, is now breaking 180 tons of stone for the crusher every 24 hours. I may say, of all our machinery, that for simplicity of construction and dispatch in their work, they are equal to anything in the kingdom, but your stone breaker surpasses them all. W. WILLIAMS.

H. R. Marsden, Esq., Leeds.

Chacewater, Cornwall, Jan. 27, 1869.—I have great pleasure in stating that the patent stone breaker I bought of you some three years ago for mines in Chili, continues to do its work well, and gives great satisfaction. It crushes the hardest copper ore stone—put it through 1/2 inch size by horse power—with great ease. I can safely recommend it to all in want of a crusher; can be driven by steam, water, or horse power. H. R. Marsden, Esq. JAMES PHILLIPS.

Terras Tin Mining Co. (Limited), near Grantham, Cornwall, Jan. 1871.—Blake's patent stone crusher, supplied by you to this company, is a fascination—the wonder and admiration of the neighbourhood. Its simplicity is also surprising. Persons visiting it when not at work have been heard to remark, "This can't be all of the machine." It will crush to a small size from 8 to 10 tons of very hard and tough elvan rock per hour; taking into its leviathan jaws pieces of the hardest rock, weighing 200 lbs. or more, masticating the same into small bits with as much apparent ease and pleasure as does a horse his mouthful of oats. On every 10 tons of the rock crushed by the machine there is a direct saving to the company of not less than £5 over the process of hand labour previously adopted by them, and the indirect saving much more, the machine being ever ready to perform the duties required of it. It breaks the stuff much smaller, and in form so fitted for the stamps, that they will pulverise one-third more in a given time than when performed by hand labour. JOS. GILBERT MARTIN.

H. R. Marsden, Esq., Leeds.

Welsh Gold Mining Company, Dolgelly.—The stone breaker does its work admirably, crushing the hardest stones and quartz. WM. DANIEL.

Ovoca, Ireland.—My crusher does its work most satisfactorily. It will break 10 tons of the hardest copper ore stone per hour. WM. G. ROBERTS.

General Fremont's Mines, California.—The 15 by 7 in. machine effects a saving of the labour of about 30 men, or \$75 per day. The high estimation in which we hold your invention is shown by the fact that Mr. Park has just ordered a third machine for this estate. SILAS WILLIAMS.

Your stone breaker gives us great satisfaction. We have broken 101 tons of Spanish pyrites with it in seven hours. EDWARD AARON.

H. R. Marsden, Esq. Weston, near Euncuma.

ROCK DRILLING MACHINERY.



don, Davidson, and Warrington's
Patent.

References, particulars,
Estimates, &c.,
Sent on application.

CHARLES BALL AND CO., lately Sole Agents for
THE BURLEIGH ROCK DRILL,

ARE NOW PREPARED TO SUPPLY THEIR NEW
ROCK-BORING MACHINE, OR "POWER JUMPER,"

Which they consider far superior to any other Rock-boring Machinery existing, and which they have, therefore, undertaken to bring before the public. The Firm's principal

"INVENTORS OF NONE—AGENTS FOR THE BEST"

Secures to its customers the best known machinery, as the Firm is entirely impartial in its adoption of any particular style of machine.

THE "POWER JUMPER"

Is recommended to the public on account of its qualities, which are the following. It is—

**CHEAPER,
SIMPLER,
LIGHTER,
SHORTER,
THAN ANY OTHER.
COMPARISON INVITED.**

Secondhand
**BURLEIGH DRILLS
FOR SALE.**

CHARLES BALL AND CO., Mining Machinery Makers, 21, NEW BRIDGE STREET, LONDON, E.C.

OSWALD BROOKE AND CO.,

**51, DALE STREET,
PICCADILLY,**

MANCHESTER,

PATENTEES AND SOLE MANUFACTURERS

OF
**GOVERNMENT
FIREPROOF**

BRATTICE CLOTH

AND
AIR TUBING.

WORKS: COLLYHURST.

ESTABLISHED 1852.

WEIGHING MACHINERY.

HODGSON AND STEAD,
MANUFACTURERS,

Egerton Works & Hope Foundry,
SALFORD, MANCHESTER.



THE
RAILWAY SPRING COMPANY,
MILLSANDS, SHEFFIELD.

Having purchased from the Trustee of the late Firm of W. Charles and Co. the extensive works, with the valuable and improved machinery, are prepared to execute orders for every description of
RAILWAY SPRINGS.



By a special method of preparation, this leather is made solid, perfectly close in texture, and impermeable to water; it has, therefore, all the qualifications essential for pump buckets, and is the most durable material of which they can be made. It may be had of all dealers in leather, and of—

I. AND T. HEPBURNS AND SONS,
TANNERS AND CURRIERS, LEATHER MILLBAND AND HOSE PIPE
MANUFACTURERS,
LONG LANE, SOUTHWARK, LONDON.

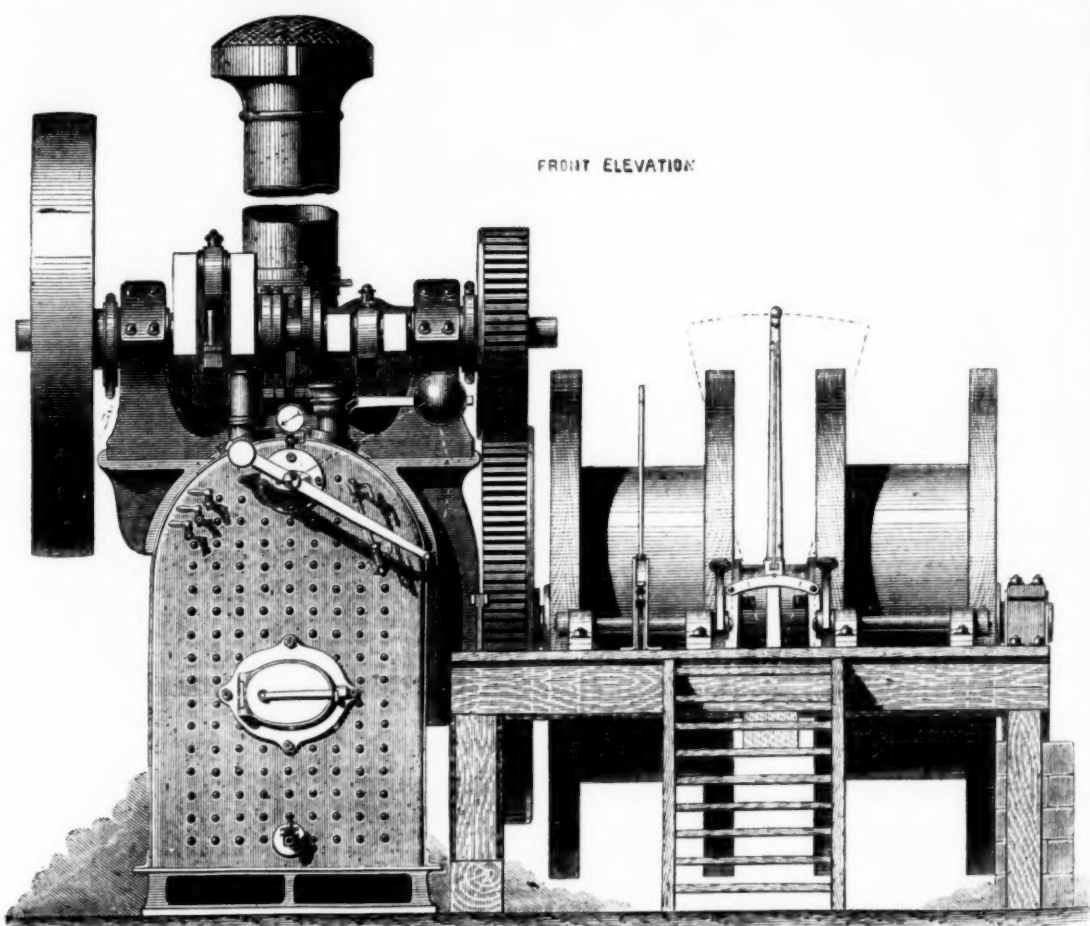
Prize Medals, 1854, 1855, 1862, for
MILL BANDS, HOSE, AND LEATHER FOR MACHINERY PURPOSES.

THE GREAT ADVERTISING MEDIUM FOR WALES.
THE SOUTH WALES EVENING TELEGRAM
(DAILY), and
SOUTH WALES GAZETTE
(WEEKLY), established 1857.

The largest and most widely circulated papers in Monmouthshire and South Wales.
CHIEF OFFICES—NEWPORT, MON.; and at CARDIFF.

The "Evening Telegram" is published daily, the first edition at Three P.M., the second edition at Five P.M. On Friday, the "Telegram" is combined with the "South Wales Weekly Gazette," and advertisements ordered for not less than six consecutive insertions will be inserted at a uniform charge in both papers.
P. O. O. and cheques payable to Henry Russell Evans, 14, Commercial-street, Newport, Monmouthshire.

THE ROBEY MINING ENGINE.



FROM 20 TO 200 EFFECTIVE HORSE-POWER.

FOR FULL PARTICULARS AND PRICES, APPLY TO—

ROBEY AND COMPANY, LIMITED,
PERSEVERANCE IRONWORKS, LINCOLN.

ALSO OF PATENT PORTABLE

HAULING AND WINDING ENGINE

WITH
PATENT DRUM WINDLASSES,
FOR MINING PURPOSES.

This Engine is specially commended to Mining Engineers and others, as by its adoption—
Haulage along inclined drifts is easily and cheaply effected;
The expense of sinking new shafts is greatly reduced, neither foundations nor engine-house being required
It is available not only for winding, but for pumping, sawing, &c.—a great desideratum at a large colliery;
It can be very quickly removed (being self-propelling), and fixed in any desired position.
Prices and full particulars on application as above, and also references to view the engine in successful work near Derby, Carnarvon, Haverfordwest, Darlington, Durham, Penzance, and other places.

THESE ENGINES WORK WITH MARVELLOUS ECONOMY IN FUEL.

CHAS. PRICE AND CO.'S RANGOON ENGINE OIL,
AS SUPPLIED TO H.M. DOCKYARDS AND FLEET.



THIS OIL is suitable to every kind of Machinery. As a lubricant it is equal to the best Spermaceti or Lard Oil, while it possesses the great advantage of being entirely free from any principle which will corrode the metal bearings.

For particular kinds of Machinery, the Oil may be specially prepared of a consistency and character adapted to the nature of the work to be done.

"I herewith certify that the Rangoon Engine Oil, manufactured by Messrs. Chas. Price and Co., is free from any material which can produce corrosion of the metal work of machinery. It is indeed calculated to protect metallic surfaces from oxidation.

"The lubricating power of this oil is equal to Spermaceti or Lard Oil.

"T. W. KEATES, F.C.S., &c., &c.
Every parcel of the Oil sent from the work bears the Trade Mark of the Firm.

LONDON: CASTLE BAYNARD, UPPER THAMES STREET.
WORKS: MILLWALL, POPLAR; and ERITH, KENT

THE "BURLEIGH" ROCK-DRILLING MACHINERY.

THOMAS BROWN,
PATENTEE AND SOLE PROPRIETOR.

THE "BURLEIGH"
AIR COMPRESSOR,
THOMAS BROWN,
PATENTEE & SOLE PROPRIETOR.

THE "BURLEIGH" ROCK DRILL. This celebrated ROCK DRILL, which by reason of its inherent merits has superseded all other Rock Drills, is now in extensive use in America, England, Scotland, and the Continent, and is indispensable in the economic working of all Railway Cuttings, Shafts, Quarries, and Mines. Its prominent features are:—

I.—ITS SIMPLICITY.
Any labourer can work it, and it does not get out of order. It may be worked either by air or steam power, at will, without any alteration of the mechanism.

II.—ITS DURABILITY.
No part of the mechanism is exposed; it is all enclosed within the cylinder—so there is no risk of its being broken.

III.—ITS CAPABILITY.
In hard rock, like granite, gneiss, ironstone, quartz, the Tunnel Drill will progress at the incredible rate of 6 inches to 12 inches per minute. These machines can bore holes from 1 inch up to 5 inches in diameter, and, on an average, will go through 120 feet of rock per day—making 40 holes each from 2 to 3 feet deep. The drill can be used at any angle, and in any direction, and will drill and clear itself to any depth up to 20 feet.

IV.—ITS ECONOMY.
As compared with hand labour the saving in actual drilling is very considerable, from the fact of the "out put" being increased fourfold. The saving in the general expenses, and in the interest of capital, will be in a like ratio.

DRILL POINTS.
The saving in steel alone is incredible. ONE DRILL POINT WILL GO THROUGH TWENTY FEET OF ABERDEEN GRANITE WITHOUT SHARPENING. This fact will be duly appreciated by practical men.

For testimonials, estimates, and other information, apply to—

T. BROWN & CO., Engineers, 96, Newgate-street, London, E.C.

WILSON, McLAY, & CO., Sole Agents, 2, Talbot-court, Gracechurch-street, London, E.C.; and 87, St. Vincent-street, Glasgow.

CRAVEN BROTHERS, Engineers (the Makers), Vauxhall Ironworks, Osborne-street, Manchester.

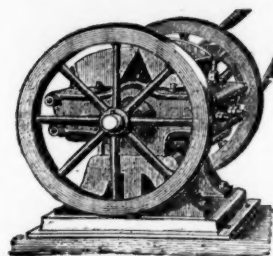


For driving the "Burleigh" Drill, or other Machinery.

For further particulars, and all information relating thereto, please address—

T. BROWN & CO.,
ENGINEERS,
96, NEWGATE STREET, LONDON, E.C.;

WILSON, McLAY, & CO.,
SOLE AGENTS,
2, TALBOT COURT, GRACECHURCH STREET, LONDON, E.C.;
AND
87, ST. VINCENT STREET, GLASGOW.
CRAVEN BROTHERS,
THE MAKERS,
VAUXHALL IRON WORKS, OSBORNE STREET, MANCHESTER.



Machine No. 1.—The Direct Double-Action.

IMPROVED
PATENT STONE BREAKING,
QUARTZ CRUSHING,
AND GRINDING MACHINERY.

Messrs. T. BROWN and Co., ENGINEERS, have much pleasure in calling attention to their IMPROVED MACHINERY for STONE BREAKING and QUARTZ CRUSHING, for crushing, grinding, or triturating Stone, Flint, Minerals, Ores, Chemicals, and other substances; for washing and separating Metals from Ores, and for extracting Gold from Quartz.

The principle of this invention is applied to machines of various construction, which contain within the range of their capability the power of reducing all hard materials to cubes of from 2½ inches to impalpable powder. The mechanical construction of each description of machine is specially adapted for its own peculiar work, and experience has shown that each is eminently suited for the work for which it is designed.

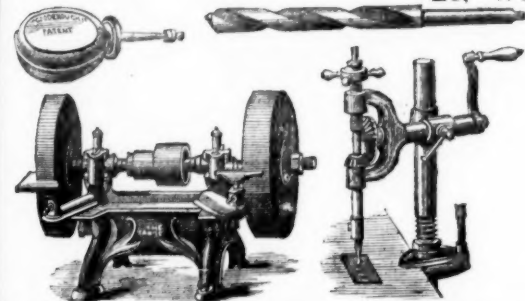
They can be driven by water, steam, or horse power; they are light and portable, and their crushing and grinding surfaces are so constructed that when worn they can easily be replaced.

If intending purchasers would send a sample of the materials required to be crushed or broken it could be operated upon in their presence, and thus they would be guided in the selection of the machine best suited for their requirements.

For prices, and all information relating thereto, please address—

T. BROWN & CO.,
ENGINEERS,
96, NEWGATE STREET, LONDON, E.C.
Or their representatives,—
WILSON, McLAY, & CO.,
2, TALBOT COURT, GRACECHURCH STREET, LONDON, E.C.;
AND
87, ST. VINCENT STREET, GLASGOW.

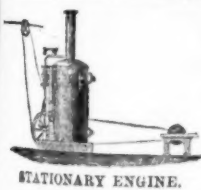
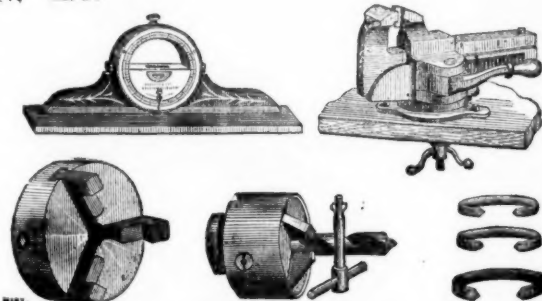
CHARLES CHURCHILL AND CO., IMPORTERS AND FACTORS OF AMERICAN MACHINERY AND TOOLS, 28, WILSON STREET, FINSBURY, LONDON, E.C.



SOLE AGENTS FOR
Morse's Twist Drill, and Machine Company's celebrated Twist Drills and Chucks; American Scroll Chucks; Stephens' Patent Vices; Parker's Patent Parallel and Swivel Vices; Gould Manufacturing Company's Well and Cistern Pumps; Washita, Arkansas, and Hindostan Oil Stones; and all other descriptions of American Tools and Machinery, &c., &c.

C. C. and Co. are prepared to give quotations and execute orders for American Goods of all descriptions, to be shipped to any port.

CATALOGUES AND PRICES CURRENT ON APPLICATION.



STATIONARY ENGINE.

CHAPLIN'S PATENT STEAM ENGINES & BOILERS

(PRIZE MEDAL, INTERNATIONAL EXHIBITION, 1862),

The ORIGINAL combined Vertical Engines and Boilers, introduced by Mr. CHAPLIN in 1855. Each class kept in Stock for Sale or Hire.

WIMSHURST, HOLICK, & CO., ENGINEERS,
WORKS: REGENT'S PLACE, COMMERCIAL ROAD EAST, LONDON, E.

(At Regent's Canal, near Stepney Station).

CITY OFFICE: 117, CANNON STREET, LONDON, E.C.



STEAM CRANE.

SOLID DRAWN BRASS BOILER TUBES,
FOR LOCOMOTIVE AND MARINE BOILERS,
EITHER
MUNTZ'S OR GREEN'S PROCESS.

MUNTZ'S METAL COMPANY (LIMITED),
FRENCH WALLS,
NEAR BIRMINGHAM.

MINERS' PRICKERS AND STEMMERS

MUNTZ'S METAL,
ACCORDING TO THE NEW MINES REGULATION ACT.
BEST KNOWN MATERIAL.
MUNTZ'S METAL COMPANY (LIMITED),
FRENCH WALLS,
NEAR BIRMINGHAM.

BOLTS AND NUTS. BOLTS AND NUTS.

MADE BY PATENT MACHINERY.

Suitable for Engineers, Millwrights, Coach and Wagon Builders, Colliery, and other Purposes.

AN EXTENSIVE ASSORTMENT OF OVER 200 TONS ALWAYS IN STOCK.

From which orders can be promptly executed. Every description of Bolts and Nuts made to order.

BAR IRON. BAR IRON.

OVER 1000 TONS OF BARS, PLATES, SHEETS, ANGLES, HOOPS, SQUARES, ROUNDS, AND FLATS.
All of First-class Quality.

RAILWAY, COLLIERY, AND TRAM RAILS, TO ANY SECTION.

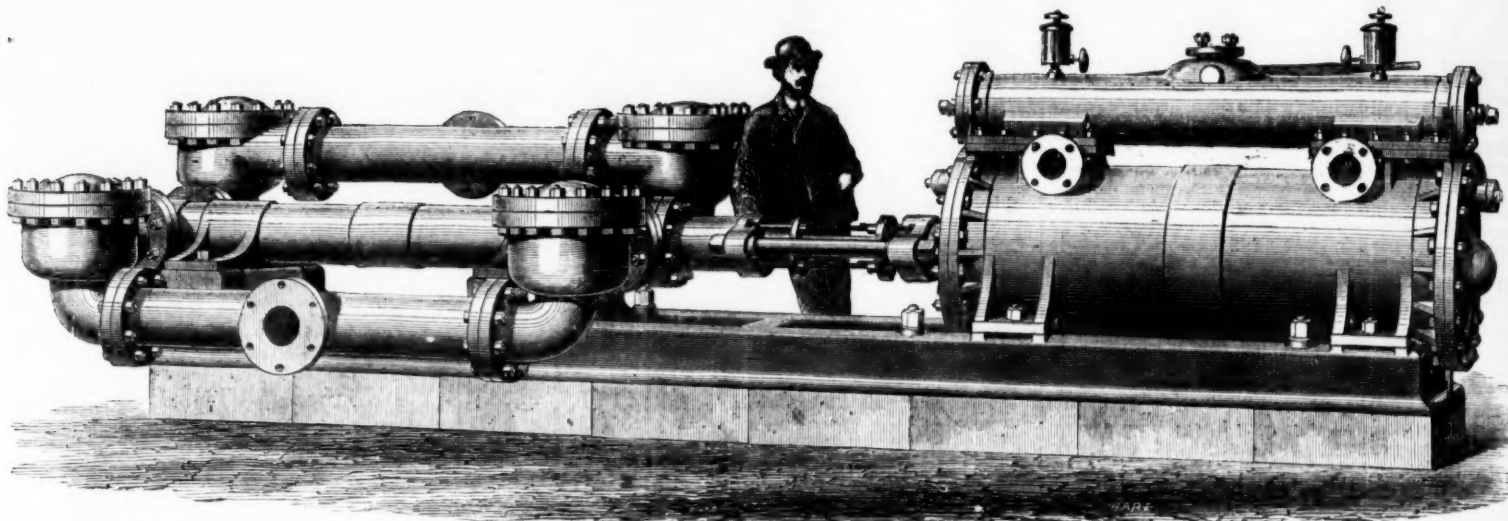
A large Stock of Anvils, Vices, Tug Irons, Smiths' Bellows, Files, Rasps, Picks, Spades and Shovels, Sledge and Hand Hammers, Best Swedish Horse Nails, Back Bands, Plough Traces, Best Spring, Cast, Double Shear, and Blister Steel.

JOHN STANSFELD (late Stansfeld and Sons), Iron Merchants, Bolt and Nut Manufacturers,

ALFRED STREET BOAR LANE, LEEDS.

TANGYE BROTHERS AND HOLMAN
10, LAURENCE POUNTNEY LANE, LONDON,
CORNWALL WORKS (TANGYE BROTHERS), BIRMINGHAM,
NEWCASTLE-ON-TYNE (TANGYE BROTHERS AND RAKE), OFFICES AND WAREHOUSE, ST. NICHOLAS' BUILDINGS.
SOLE MAKERS OF

THE "SPECIAL" DIRECT-ACTING STEAM PUMPING ENGINE
FOR FORCING WATER FROM MINES.
Nearly 3000 in Use.



The "SPECIAL" Direct-acting Steam Pumping Engines require no costly Engine Houses or massive foundations, no repetition of Plunger Lifts, ponderous Connecting-rods, or complication of Pitwork, and allow a clear shaft for hauling purposes.

Extract from "ENGINEERING," September 6th, 1872:—

"The accompanying engraving illustrates a large specimen of the 'Special' Steam Pump, which was brought before the public about four years since by Messrs. Tangye Brothers and Holman. The Pump is the invention of Mr. S. Cameron, of New York, and since its introduction Messrs. Tangye have turned out nearly 3000 from their works.

"These pumps are of various sizes, and at first only small ones were made, but as their usefulness became developed the manufacturers designed pumping engines on the same principle for use in collieries. They were first applied to this purpose in the Newcastle collieries about three years since, and through the efforts of the late Mr. A. Stansfield Rake, under the direction of Messrs. Tangye, about 130 of these pumps had been introduced—principally in the collieries of the Durham and Newcastle districts, up to the end of 1870. They were adapted to perform the required duty—varying in almost every case—of forcing from 1000 to 10,000 gallons per hour from depths ranging from 100 to 500 ft. The success of this system of pumps led Mr. J. Bigland, the manager of Messrs. Pease's Bishop Auckland Collieries, to conclude that it was adapted for yet heavier work. The result of his investigations into its working led to the manufacture of the engine we have illustrated, for the Adelaide Collieries, belonging to Messrs. Pease, at Bishop Auckland.

"The construction of the Special Steam Pump is so well known

that we need now do no more than refer to the dimensions of the various parts. The steam cylinder is 26 in. diameter, and the pump—which is double acting—is 6½ in. diameter, with a 6-ft. stroke. The slide valve is steam-moved, and its alternate action is effected by means of two steel reversing valves, operated by the piston in the interior of the cylinder at either end. Hence there is no external mechanism except the piston rod, a few inches only of which is seen reciprocating between the stuffing boxes of the steam and pump cylinders. In the contract it was stipulated that the engine should raise 120 gallons per minute 1040 ft. high in a single lift, and this is more than accomplished, with apparently as much ease as if its load was delivered at only 100 ft. high.

"The engine-room at the Adelaide Collieries is situated at a depth of 1040 ft. below the surface, and is an arched chamber, about 100 ft. long by 20 ft. wide, and 10 ft. high at centre. At the far end of this chamber is a double-flued boiler, 27 ft. long and 7 ft. in diameter. Placed between the boiler and the shaft is the pumping engine we have been describing. It was started on June 6, 1871, and Mr. Bigland reported that, having measured its duty, he found the average of seven trials to be 137 gallons per minute, thus giving a higher duty than was stipulated for in the contract.

"A still larger Special Steam Pump than the one already described

has since been made by Messrs. Tangye for Messrs. Stannier's Collieries, Silverdale, Staffordshire. The steam cylinder of this engine is 32 in. in diameter, and the water cylinder 10½ in.; the stroke is 6 ft., and the engine has to raise 22,500 gallons per hour 540 ft. high. Two out of eight engines for some extensive coal mines in Germany are also in a forward state; each of these engines is to be capable of raising 150 gallons per minute, or 9000 gallons per hour, 700 ft. high. This system of underground pumping engine undoubtedly carries with it the recommendations of simplicity and great power with a small number of mechanical parts. Its first cost is also moderate, as compared with the method of raising water from depths by a series of 40 or 50 ft. lifts. Its practical value was tested in 1867 by the award of a silver medal by the Royal Polytechnic Society, which is composed chiefly of mining engineers. In fact, these engines appear to solve a very important commercial question in mining operations—viz., the most economical and effective means of deep mine drainage. Their success has been established in the coal mines of Durham and Newcastle, and there is reason why their adoption should not follow, as occasion requires in the copper and tin mines of Cornwall, some of which are of great depth; and especially for foreign mines, where transport convenience and economy are of paramount consideration."

The "Special" Steam Pumping Engines are in use at the following among many other Collieries:—

Adelaide Colliery, Bishop Auckland.....	3 Pumps.	North Bitchburn Colliery, Darlington.....	2 Pumps.	Stott, James and Company, Burslem	1 Pump.
Acomb Colliery, Hexham	1 "	Newton Cap Colliery, Darlington	1 "	Straker and Love, Brancepeth Colliery	1 "
Blackfell Colliery, Gateshead	1 "	Normanby Mines	1 "	Seaton Delaval Coal Colliery, near Newcastle	1 "
Black Boy Colliery, Gateshead	1 "	Oakenshaw Colliery	1 "	Thornley Colliery, Ferryhill	2 "
Castle Eden Colliery.....	2 "	Pease's West Colliery	2 "	Thompson, John, Gateshead	2 "
Carr, W. C., Newcastle.....	4 "	Pease, J. and J. W., near Crook	5 "	Trimdon Grange Colliery	1 "
Etherley Colliery	1 "	Pease, J. and J., Brandon Colliery	1 "	Tudhoe Colliery.....	4 "
Gidlow, T., Wigan	3 "	Pegawood Colliery, near Morpeth.....	2 "	Vobster and Mells Colliery.....	2 "
Haswell, Shotton and Easington Coal Company	3 "	Pelton Fell Colliery	1 "	Widdrington Colliery, Morpeth.....	5 "
Lochgelly Iron and Coal Company	2 "	Railey Fell Colliery, Darlington	1 "	Whitworth and Spennymoor Colliery	5 "
Lochore and Capeldrae Cannel Coal Company	6 "	Right Hon. Earl Durham, Fence Houses.....	1 "	Westerton Colliery, Bishop Auckland	1 "
Leather, J. T., near Leeds	2 "	Skelton Mines	1 "	Wardley Colliery, Gateshead	1 "
Lumley Colliery, Fence Houses.....	1 "	South Benwell Colliery	5 "	Westminster Brynbo Coal Company	2 "
Monkwearmouth Colliery, Sunderland	1 "	St. Helens (Tindale) Colliery.....	1 "	Weardale Coal and Iron Company	5 "

PARTICULARS OF THE "SPECIAL" STEAM PUMPING ENGINES SUITABLE FOR HIGH LIFTS IN MINES.

Diameter of Steam Cylinder	6	8	10	8	12	16	10	14	18	21	14	18	21	26	16	21	24
Diameter of Water Cylinder	3	3	3	4	4	4	5	5	5	5	6	6	6	6	7	7	7
Length of Stroke	24	24	36	24	36	48	24	36	36	48	36	36	48	72	36	48	48
Strokes per minute	30	30	20	30	20	15	30	20	20	15	30	20	15	10	20	15	15
Gallons per hour	2,200	2,200	2,200	3,900	3,900	3,900	6,100	6,100	6,100	6,100	8,800	8,800	8,800	8,800	11,900	11,900	11,900
Height in feet to which water can be raised with 40 lbs. pressure per square inch of steam at pump	240	425	665	240	540	990	240	470	775	1,058	330	540	740	1,140	312	540	700
Diameter of Suction and Delivery ..	2	2	2	3	3	3	3½	3½	3½	3½	4	4	4	4	5	5	5
Diameter of Steam Inlet	1	1½	1½	1½	2½	2½	1½	2½	3	3½	2½	3	3½	4	2½	3½	4
Diameter of Exhaust	1	1½	1½	1½	2½	3	1½	2½	3½	4	2½	3½	4	5	3	4	5

PARTICULARS, &c.—Continued.

Diameter of Steam Cylinder	30	18	24	30	32	18	24	30	36	21	30	36	42	26	36	44	50
Diameter of Water Cylinder	7	8	8	8	8	9	9	9	9	10	10	10	10	12	12	12	12
Diameter of Stroke	72	36	48	72	72	36	48	48	72	48	72	72	72	48	72	72	96
Strokes per minute	10	20	15	10	10	20	15	15	10	15	10	10	10	15	10	10	7½
Gallons per hour	11,900	15,660	15,660	15,660	15,660	19,800	19,800	19,800	19,800	24,400	24,400	24,400	24,400	35,240	35,240	35,240	35,240
Height in feet to which water can be raised with 40 lbs. pressure per square inch of steam at pump	1,100	300	540	840	990	240	427	665	990	264	540	780	1,062	282	540	800	1,040
Diameter of Suction and Delivery ..	5	6	6	6	6	7	7	7	7	8	8	8	8	10	10	10	10
Diameter of Steam Inlet	5	3	4	5	5½	3	4	5	6	3½	5	6	7	4	6	8	8½
Diameter of Exhaust	6	3½	5	6	6½	3½	5	6	7	4	6	7	8	5	7	9	10

PRICES OF THE ABOVE ON APPLICATION.

Any combination can be made between the Steam and Water Cylinders, to suit Height of Lift and Pressure of Steam.

TANGYE BROTHERS & HOLMAN, 10, Laurence Pountney Lane, London, E.C.